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OPERATIONS & SERVICE MANUAL
Manual 20-29
Revised 9/15/07

ITWDynatec

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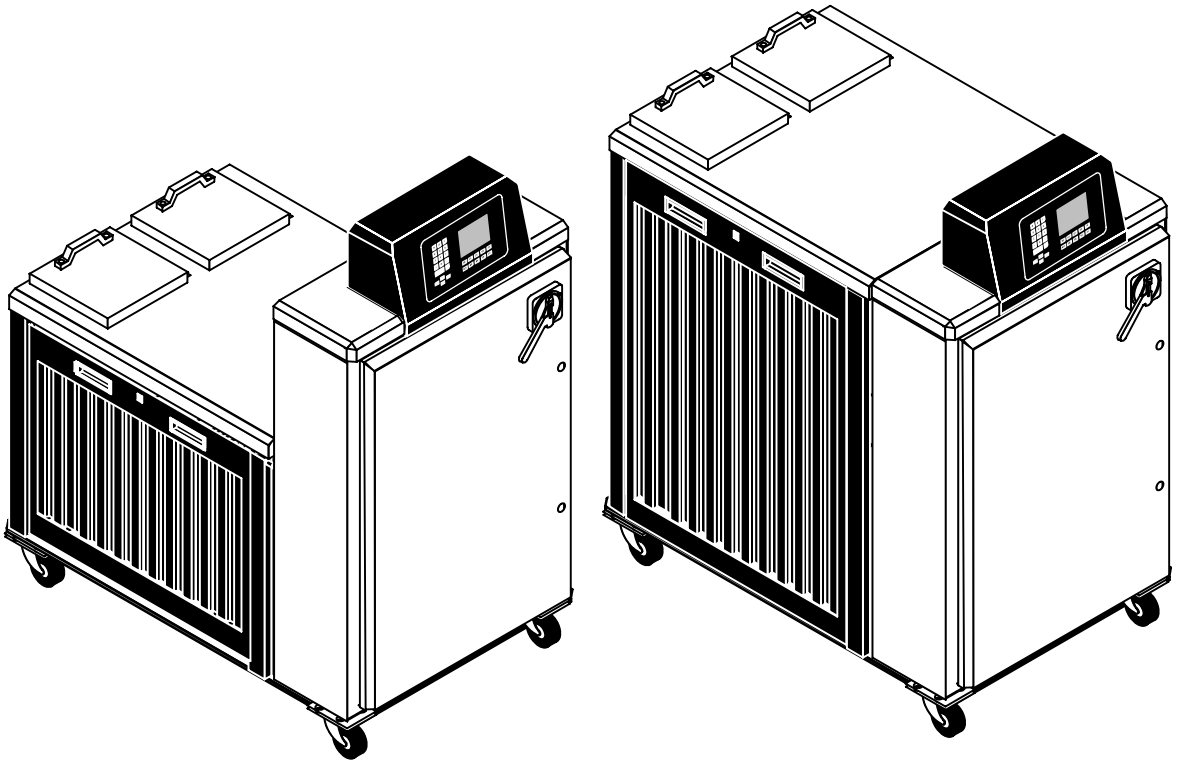
DYNAMELT® M SERIES ADHESIVE SUPPLY UNIT OPERATIONS AND SERVICE MANUAL

Models: DM M70 & M140 PLC



For an online copy of this manual, go to www.itwdynatec.com/manuals.htm

IMPORTANT ! - READ ALL INSTRUCTIONS BEFORE OPERATING THIS EQUIPMENT

It is the customer's responsibility to have all operators and service personnel read and understand this information. Contact your ITW Dynatec customer service representative for additional copies.

NOTICE! Please be sure to include the serial number of your application system each time you order replacement parts and/or supplies. This will enable us to send you the correct items that you need.

ITW Dynatec Service Parts Direct Dial: 1-800-538-9540
ITW Dynatec Technical Service Direct Dial: 1-800-654-6711

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Chapter 1
SAFETY PRECAUTIONS

All operators and service personnel must read and understand this manual before operating or servicing equipment.

All maintenance and service on this equipment must be performed by trained technicians.

Electrical

Dangerous voltages exist at several points in this equipment. To avoid personal injury, do not touch exposed connections and components while input power is on. Disconnect, lockout and tag external electrical power before removing protective panels.

A secure connection to a reliable earth ground is essential for safe operation.

A disconnect switch with lockout capability must be provided in the line ahead of the unit. Wiring used to supply electrical power should be installed by a qualified electrician.

High Temperatures

Severe burns can occur if unprotected skin comes in contact with molten adhesive or hot application system parts.

Safety glasses, gloves and long- sleeved clothing must be worn whenever working with or around adhesive application systems.

High Pressure

To avoid personal injury, do not operate the equipment without all covers, panels and safety guards properly installed.

To prevent serious injury from molten adhesive under pressure when servicing the equipment, disengage the pumps and relieve the adhesive system's hydraulic pressure (e.g., trigger the heads, hand-held applicators, and/or other application devices into a waste container) before opening any hydraulic fittings or connections.

IMPORTANT NOTE: Even when a system's pressure gauge reads "0" psig, residual pressure and trapped air can remain within it causing hot adhesive and pressure to escape without warning when a filter cap or a hose or hydraulic connection is loosened or removed. For this reason, always wear eye protection and protective clothing.

Either of the two High Pressure symbols shown may be used on equipment.

Protective Covers

Keep all guards in place!

To avoid personal injury, do not operate the application system without all covers, panels and safety guards properly installed.

Eye Protection & Protective Clothing

It is very important that you PROTECT YOUR EYES when working around hot melt adhesive equipment!

Wear safety glasses with side shields which conform to ANSI Z87.1 or EN166.

Failure to wear safety glasses could result in severe eye injury.

It is important to protect yourself from potential burns when working around hot melt adhesive equipment.

Wear protective gloves and long-sleeved, protective clothing to prevent burns that could result from contact with hot material or hot components.

Always wear steel-reinforced safety shoes.

Safe Installation and Operation

To avoid possible failure of hoses, make sure all hoses are routed to avoid kinking, tight radius turns (8” or less) and abrasive contact. Hot-melt hoses should not have prolonged contact with heat-absorbing surfaces such as cold floors or metal troughs. These heat-absorbing surfaces can alter adhesive flow and cause incorrect calibration. Hoses should never be covered with materials that prevent heat dissipation, such as insulation or sheathing.

Read this manual before applying electrical power to the equipment. Equipment may be damaged by incorrect electrical connections.

Do not use adhesive that is dirty or that may be chemically contaminated. Doing so can cause system clogging and pump damage.

When adhesive hand-held applicators or other movable applicators are used, never point them at yourself or at any other person. Never leave a hand-held applicator’s trigger unlocked when not actually in use.

Do not operate the hopper or other system components without adhesive for more than 15 minutes if the temperature is 150 degrees C (300 degrees F) or more. To do so will cause charring of the residual adhesive.

Never activate the heads, hand-held applicators and/ or other application devices until the adhesive’s temperature is within the operating range. Severe damage could result to internal parts and seals.

Treatment for Burns From Hot Melt Adhesives

Burns caused by hot melt adhesive must be treated at a burn center.

Care should be used when working with hot melt adhesives in the molten state. Because they rapidly solidify, they present a unique hazard.
Even when first solidified, they are still hot and can cause severe burns. When working near a hot melt application system, always wear safety gloves, safety glasses and long-sleeved, protective clothing.

Always have first-aid information and supplies available.

Call a physician and/or an emergency medical technician immediately.

Service

Refer all servicing to qualified personnel only.

Explosion/ Fire Hazard

Never operate this unit in an explosive environment.

Use cleaning compounds recommended by ITW Dynatec or your adhesive supplier only. Flash points of cleaning compounds vary according to their composition, so consult with your supplier to determine the maximum heating temperatures and safety precautions.

Lockout/ Tagout

Follow OSHA 1910.147 (Lockout/ Tagout Regulation) for equipment's lockout procedures and other important lockout/ tagout guidelines.

Be familiar with all lockout sources on the equipment.

Even after the equipment has been locked out, there may be stored energy in the application system, particularly in the capacitors within the panel box. To ensure that all stored energy is relieved, wait at least one minute before servicing electrical capacitors.

Use of PUR (Polyurethane) Adhesives

PUR adhesives emit fumes (MDI and TDI) that can be dangerous to anyone exposed to them. These fumes cannot be detected by the sense of smell. ITW Dynatec strongly recommends that an exhaust hood or system be installed over any PUR system.

Consult with your adhesive manufacturer for specifics about required ventilation.

CAUTION: Because of the nature of PUR adhesives to strongly bond in the presence of moisture, care must be taken to prevent them from curing inside Dynatec equipment. If PUR adhesive solidifies in a unit, the unit must be replaced. Always purge old PUR adhesive from the system per your adhesive manufacturer's instructions and timetable. ALLOWING PUR ADHESIVE TO CURE IN A UNIT VOIDS ITW DYNATEC'S WARRANTY.

In This Manual

WARNINGS and CAUTIONS are found throughout this manual.

WARNINGS mean that failure to observe the specific instructions may cause injury to personnel.

CAUTIONS mean that failure to observe the specific instructions may damage the equipment.

Chapter 2
DESCRIPTION AND SPECIFICATIONS

Description

The DYNAMELT® M70 and M140 adhesive supply units (ASU) are computer-controlled hot-melt supply units designed on metric standards. They utilize Allen Bradley SLC (small logic controller) 500 systems and they interface with Allen Bradley's PanelView touchscreen control panel.

The Dynamelt M Series ASUs are available in three cabinet sizes and offer four hopper sizes. Their microprocessor temperature control closely controls the temperature of hot-melt adhesive for up to 8 hoses and 8 heads. Temperature setpoints are operator-selected for up to 32 zones and the system automatically provides warnings and alarms for operator errors and system malfunctions.

The Dynamelt system provides accurate, proportionate temperature control for the hopper, hoses and applicators. Sequential heating delays may be programmed for turn-on of the hoses and heads. A "standby" temperature may be programmed so that the temperature zones can be maintained at a lower temperature when the ASU is not in active use, enabling rapid return to normal operation. The seven-day scheduler allows programmable automatic startup and shutdown of the ASU throughout the workweek. With these flexible temperature programming features, the Dynamelt system increases adhesive life by eliminating prolonged high adhesive temperatures. It reduces energy consumption and brings the system up to normal operating temperatures in the shortest possible time.

The SLC 500 maintains all temperature zone setpoints, alarms and motor parameters, as well as the scheduling parameters. The SLC's processor (CPU) monitors the electronic circuitry and provides alarms for error conditions. A DeviceNet module provides communication to the ASU's drives. The PanelView 600 touchscreen color controller is the operator's interface to the SLC 500 system.

The temperature control can interlock the parent machine with preselected adhesive temperatures so that production automatically begins when adhesive temperatures are correct for the application. All system temperature values can easily and quickly be programmed.

The Dynamelt M ASU uses an extremely dependable gear pump(s) to assure a smoother and higher precision flow. The single or dual pumps are driven by individual drives.

The Dynamelt's teflon-coated hopper accepts adhesive in all popular forms, including pellets, slugs and blocks. The ASU can accomodate air-actuated automatic applicators (heads), electric applicators, hand-held applicators and/or special applicators. Options available include pressure gauge, two drop-in grids, dual hopper, pneumatic clutches, digital pressure readout and adhesive level control. The DM140 is also available in a high flow model..

Specifications

Environmental:

Storage/ shipping temperature . . . . . -40° C to 70°C (-40° F to 158°F)
Ambient service temperature . . . . . -7° C to 50°C (20° F to 122°F)
Noise emission . . . . . < 60 dbA at 1 meter (39 inches)

Physical:

Dimensions . . . . . see dimensional layouts on following pages
Number of heads/ hoses . . . . . 1 to 8
Number of return hoses or auxillary zones . . . . . 1 to 8
Number of hopper temperature zones . . . . . 1 to 2
Number of pump/ motors . . . . . 1 to 4
Number of (optional) drop-in grids 2
Number of standard grids 2
Gear pumps . . . . . Zenith, 2.92 cc/rev standard
Enclosure . . . . . styled, durable metal, dust and splatter resistant
Hose connections . . . . . universal 15-pin Amphenol connectors at asu, wrench-secured fluid fittings (#6 JIC)
Hopper (tank) capacity . . . . . 210 kg/ 420 lb
Hopper construction . . . . . machined welded aluminum, Teflon impregnated
Filtration . . . . . hopper bottom screen, large pleated pump outlet filter
Weight, empty . . . . . TBD
Adhesive form . . . . . accepts most forms

Electrical:

Supply voltage . . . . . 200-240 VAC/ 3p/ 50-60 Hz
380 VAC/ 3p (“Wye”, “Y” or 5-wire connection)/ 50-60 Hz
Minimum supply amperes . . . . . see circuit breaker size
Power consumption, hopper . . . . . 10,000 watts
Power consumption, 2 drop-in grids . . . . . 5,000 watts
Hopper heater type . . . . . cast in
Temperature control . . . . . microprocessor-based proportional integral derivitive (PID)
Temperature sensors . . . . . 100 Ohm Platinum RTD standard
. . . . . 120 Ohm Nickel RTD optional
Electrical connectors . . . . . durable, latching connectors
Motor . . . . . 1/2 hp, alternating current motor, TEFC*, direct drive, vertical orientation, right angle gearbox
Maximum current available for each hose or head . . . . . 10 ampere

** totally enclosed, fan cooled*

Performance:

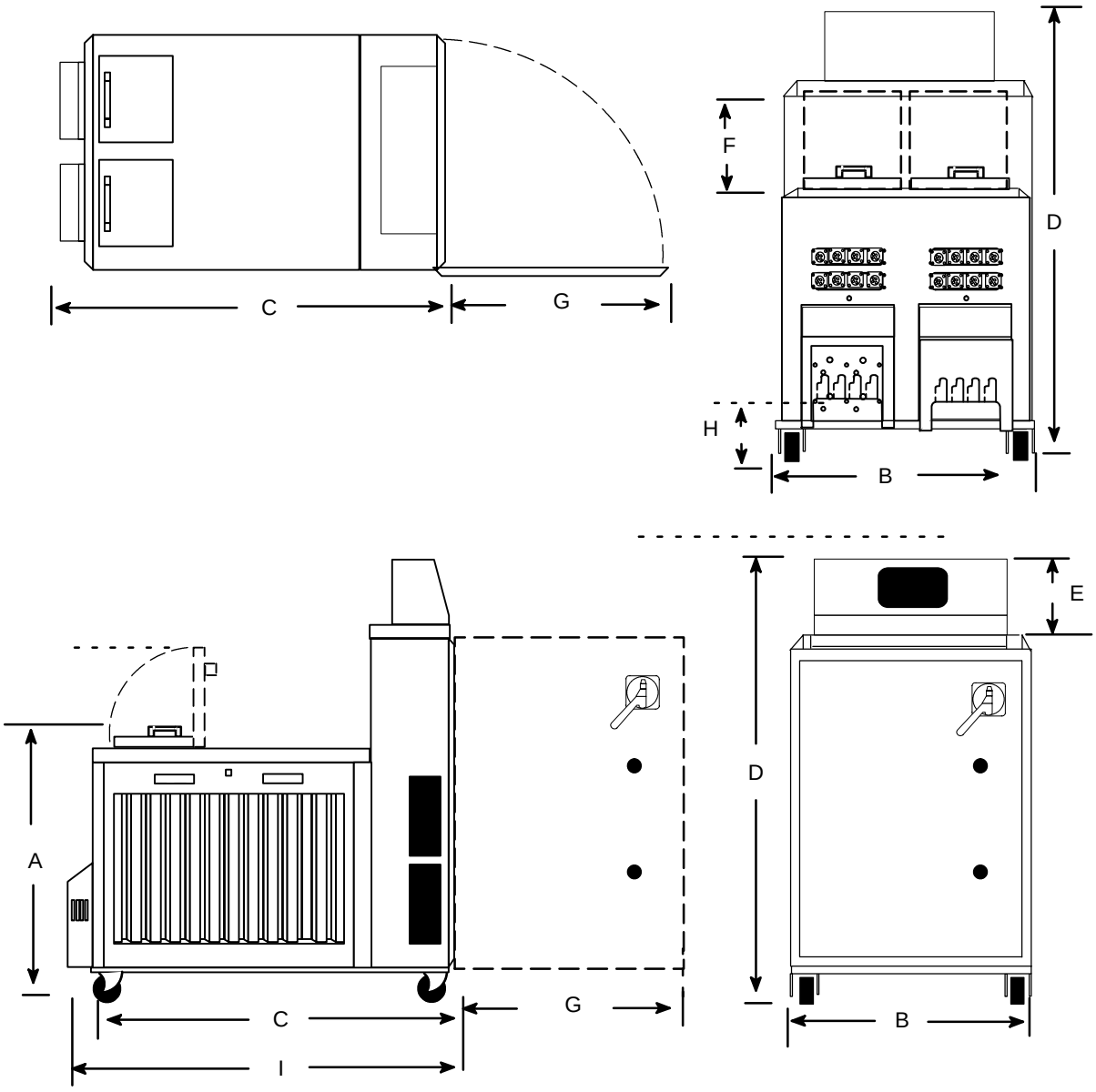
Adhesive temperature control range . . . . . 40°C to 232°C (100°F to 450°F)
Standby adhesive temperature range . . . . . up to 80°C (150°F) lower than setpoint
Hopper ready adhesive temperature deviation (factory set/ field adjustable) ± 20°C (36°F) from setpoint
Over-temperature cutoff for hopper . . . . . 232°C (450°F)
Adhesive viscosity . . . . . 500 to 50,000 centipoise
Warm-up time, full hopper . . . . . approximately 0.5 hour
Typical adhesive melt rate (depends on adhesive used) . . . . DM M70 = 27-95 kg/hr (59-209 lb/hr)
DM M140 = 34-115 kg/hr (75-253 lb/hr)
Adhesive pressure . . . . . up to 68 bar (1000 psi) maximum

Temperature Control:

RTD input board . . . . . 4 zones per board, modular construction
Line speed inputs . . . . . 1 to 4
Temperature control zones . . . . . 32 maximum with solid state relays
Power output . . . . . hopper: 10,000 watt
hose: 1200 watt
applicator head: 1200 watt
auxiliary: 2000 watt
Solid state relay input . . . . . 3-15 VDC

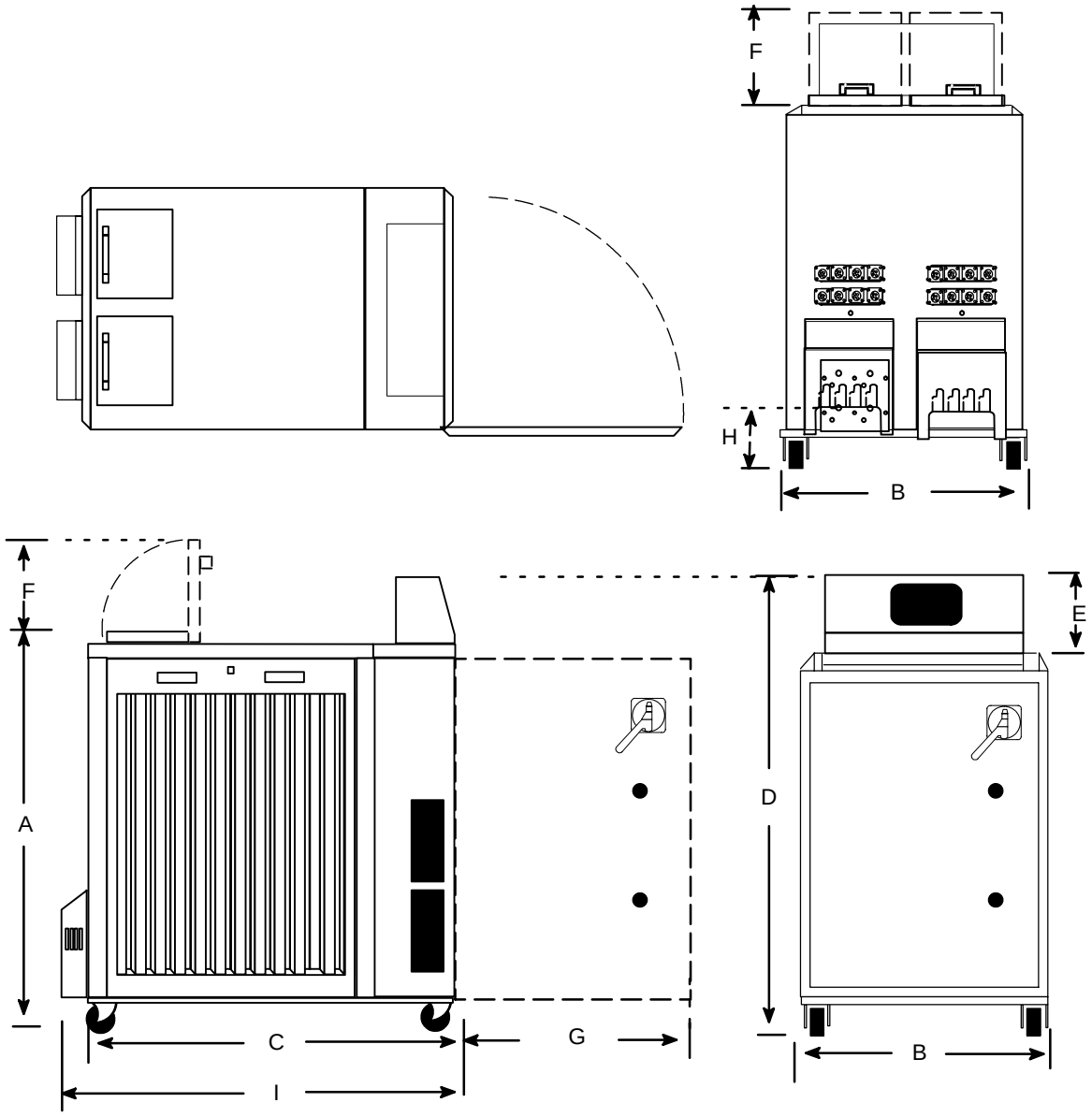
Other:

Operator interface . . . . . PanelView 600, color
Temperature standby . . . . . yes
High and low temp alarms . . . . . yes
Ready interlock . . . . . yes
Sequential heating . . . . . yes (hopper, hose, head staged heating)
Sensor open alarm . . . . . yes
RS232 and RS485 communications capable . . . . . yes
Seven-day scheduler . . . . . yes
High temperature capable . . . . . yes
RPM display . . . . . yes
Alarm & system ready outputs (120v) . . . . . yes
SLC 5/04 CPU 32K . . . . . yes
DeviceNet module . . . . . yes
Standby & E-stop inputs (120v) . . . . . yes
Remote On/Off (120v) . . . . . yes
CE approval granted . . . . . yes



DYNAMELT M70 Installation Dimensions

DIMENSION	A	B	C	D	E	F	G	H	I
mm	1002.4	850	1301.6	1622.3	177.8	342.9	838.2	320.68	1,377.7
inches	39.46	33.46	51.24	63.87	7.00	13.5	33	12.625	54.24



DYNAMELT M140 Installation Dimensions

DIMENSION	A	B	C	D	E	F	G	H	I
mm	1506.4	850	1301.6	1622.3	177.8	342.9	838.2	320.68	1377.7
inches	59.31	33.46	51.24	63.87	7.00	13.5	33	12.625	54.24

Total System Wattage Capacity

Maximum Wattage	DYNAMELT MODELS	
	M70	**M140**
Hopper + High Temp Heater	12,000 w	12,000w
PreMelt	5000 w	5000 w
Optional Drop-in Grid	– –	5000 w
Up to 8 Hose Zones (1200 w each)	9600 w	9600 w
Up to 8 Applicator Zones (1200 w each)	9600 w	9600 w
Up to 8 AUX Zones (2000 w each)	16,000 w	16,000 w
Maximum System Wattage:	***52,200 w***	***57,200 w***

Main Circuit Breaker Determination

Main circuit breakers vary depending on each unit's system configuration. ITW Dynatec typically determines the main circuit breaker by the mains load for a system, which, by codes, should be 125% to 150% of the maximum load. If a customer later modifies his system (by adding heads, hoses, auxiliary outputs, etc.), the main breaker may need to be upgraded to reflect the increase in load.

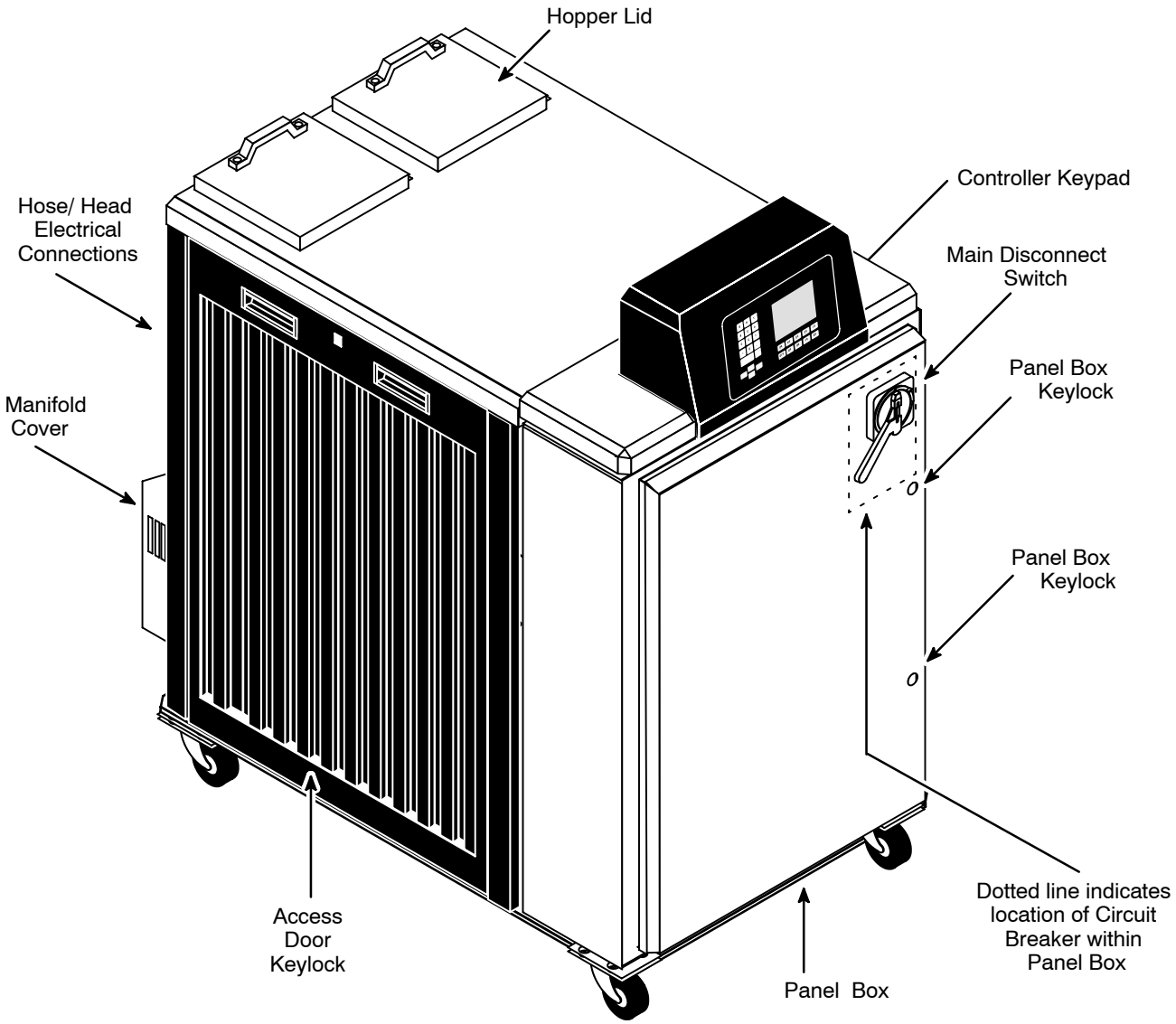
To determine your existing main circuit breaker, first determine if the ASU has been modified and the breaker upgraded accordingly. If not, and the breaker is original to the ASU, you will find the main circuit breaker listed in the Panel Box Assembly (PBA) section of the indented bill of materials inserted at the back of this manual. The main circuit breaker is the largest amperage circuit breaker listed in that bill of materials.

Chapter 3
INSTALLATION

Placing the DYNAMELT M ASU

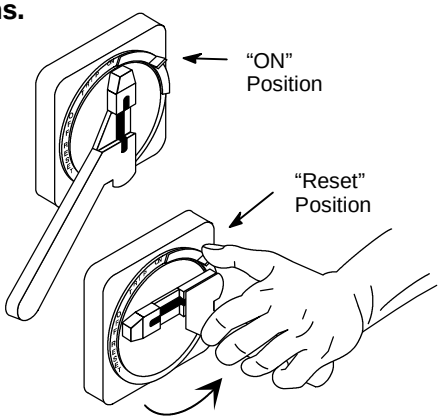
The DYNAMELT® M SERIES ASU stands alone on flat surfaces.

The main electrical power and the serial communication connections come in from below the unit and connect into the circuit breaker.



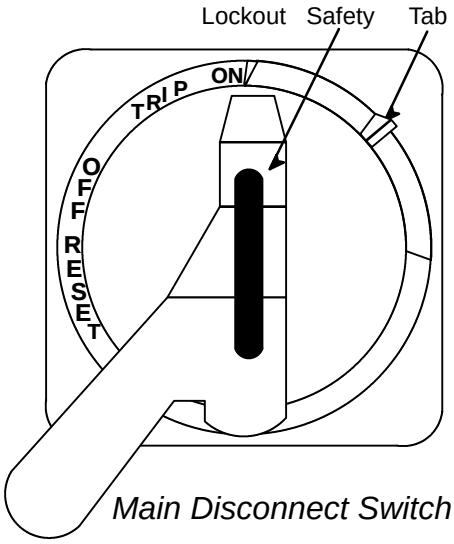
The DYNAMELT M70/ M140 ASU (model M140 shown)

Re-read Chapter 1 "Safety Precautions" before performing any installation procedures. All installation procedures must be performed by qualified, trained technicians.



To Open/ Close Panel Box Door

1. With the key supplied, unlock the panel box door.
2. Turn the main disconnect switch counterclockwise to "Reset" while pushing the tab clockwise with your thumb.
3. Pull door open.
4. *To close:* Turn switch to "ON". Hold door closed while turning switch to "Reset" and then back to "ON".
5. Lock the panel box door with the key.



Main Disconnect Switch

Installation

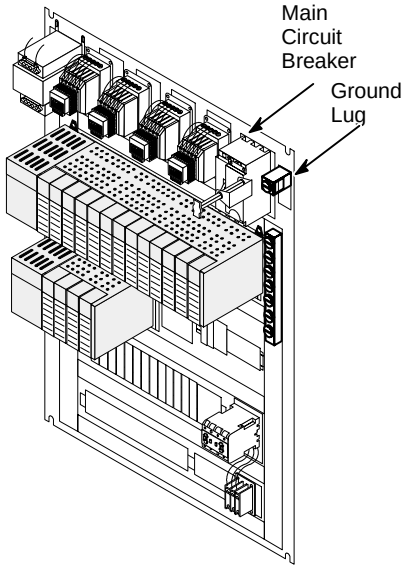
After the DYNAMELT M SERIES ASU has been properly positioned, the following general sequence should be followed for installation:

1. Make sure that incoming line power to the ASU and the unit's main disconnect switch are turned OFF.

DANGER HIGH VOLTAGE

Disconnect and lock out input power to the application system, using the lockout safety illustrated above, before starting any installation procedures. Make sure there is no electrical power on the leads you will be connecting.

2. **Required Customer Wiring**
   On the insert within the panel box assembly:
   a. Connect 3 electrical leads with the appropriate voltage to the main circuit breaker.
   b. Connect one electrical lead to the ground (PE) lug.



CAUTION: Grounding conductors never carry electrical current. The use of a neutral conducting wire as earth ground is incorrect and may cause damage to the DYNAMELT controller.

3. **Optional Customer Interface Wiring**

a. The I/O terminals provide for remote monitoring of an alarm condition. A source voltage occurs when any alarm is activated. Alarm terminals are binary (on/off) I/Os and are located on the Allen Bradley rack in the panel box assembly.

Refer to the schematics and layout drawings in Chapter 11 for details.

b. The optional LEVEL CONTOL terminals provide for remote monitoring of level control conditions. Level Control terminals are binary (on/off) I/Os and are located on Allen Bradley module rack in the panel box assembly.

Refer to the schematics and layout drawings in Chapter 11 for details.

c. The LINE SPEED terminals for "Auto" operation of the motor(s) are analog. There are two wires for each terminal (INO+ and INO–) on the Allen Bradley analog input. Polarity must match from wire to terminal (+ to + and – to –). Line speed varies between 0 and 10VDC.

Refer to the schematics and layout drawings in Chapter 11 for details.

4. The adhesive hoses are connected at the rear of the ASU (see illustration on page 3-5). Remove the manifold cover and the lower manifold cover for access. Each hose is connected at both an adhesive port and an electrical connect. Make your electrical hose connections at the numbered connects above the filter manifolds. Route hoses so that there is at least an eight-inch radius at any bend. Do not hang hoses without proper support. Do not crimp, clamp, squeeze or tie hoses.

   Two feed hose adhesive ports are located at the bottom of each filter manifold. When making hose connections, use the numbered guides shown on the illustration to coordinate: ie. when using one hose, make your hookup to electrical connection #1 and adhesive port #1. When using two head/ hoses, hookup head/ hose #1 to electrical connection #1 and adhesive port #1, then hookup hose/ head #2 to electrical connection #2 and adhesive port #2, etc.

   Two return hose adhesive ports are located at the top of each filter manifold. Use the illustration to coordinate adhesive port and electrical connections as above. Return hoses are designated as "auxiliary" ports. Refer to the hose and applicator manuals for further details.

5. Connect (optional) PSI transducers at the PSI ports labeled on the filter manifold. Position them from left to right across the manifolds as shown in the lower illustration on page 3-5. Transducers measuring adhesive pressure before it enters the filter use the ports stamped "Pre PSI" and transducers measuring pressure after the filter use the ports stamped "Post PSI". Transducers are ITW Dynatec factory-calibrated.

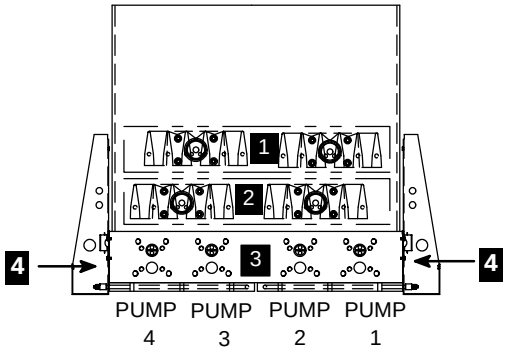
   Units not using transducers may use either a PSI port or a feed hose port to mount an (optional) pressure gauge. If all ports are in use, the pressure gauge may be installed in line with a hose.

Adding Adhesive

The adhesive level in the melt tank should be maintained at 13mm to 100mm (1/2" to 4") from the top of the hopper. Where applications demand a high output volume of adhesive, add small amounts of adhesive frequently. Adding large amounts of adhesive to an almost empty hopper will lower the temperature of the adhesive in the hopper and may cause the ASU to fall below its READY setpoint.

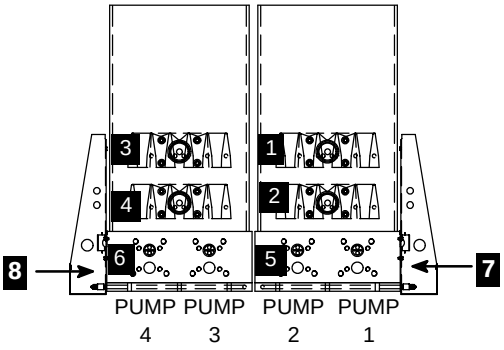
Changing the Adhesive Formula

If a different adhesive formulation from the one being currently used is needed, the system will have to be flushed if the two formulations are incompatible. See Chapter 6 of this manual for the proper flushing procedure. When in doubt about adhesive compatibility, flush your system.



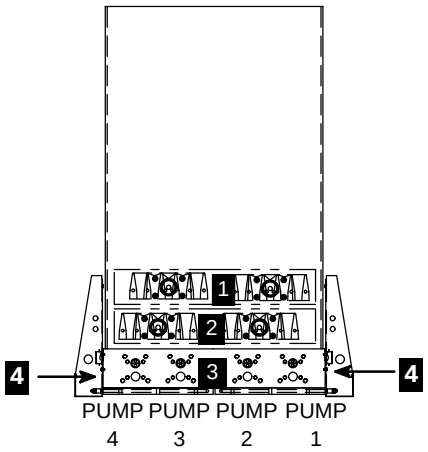
DM70 Single Hopper Temperature Zones:

Zone 1	Grid 1 (optional)	5000w
Zone 2	Grid 2 (standard)	5000w
Zone 3	Hopper (standard)	10000w
Zone 4	Primary Filter (standard)	2000w



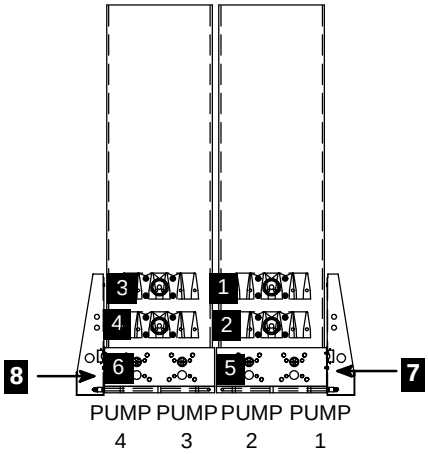
DM70 Dual Hopper Temperature Zones:

Zone 1	Grid 1 (optional)	2500w
Zone 2	Grid 2 (standard)	2500w
Zone 3	Grid 3 (optional)	2500w
Zone 4	Grid 4 (standard)	2500w
Zone 5	Hopper 1 (standard)	5000w
Zone 6	Hopper 2 (standard)	5000w
Zone 7	Pimary Filter 1 (standard)	1000w
Zone 8	Primary Filter 2 (standard)	1000w



DM140 Single Hopper Temperature Zones:

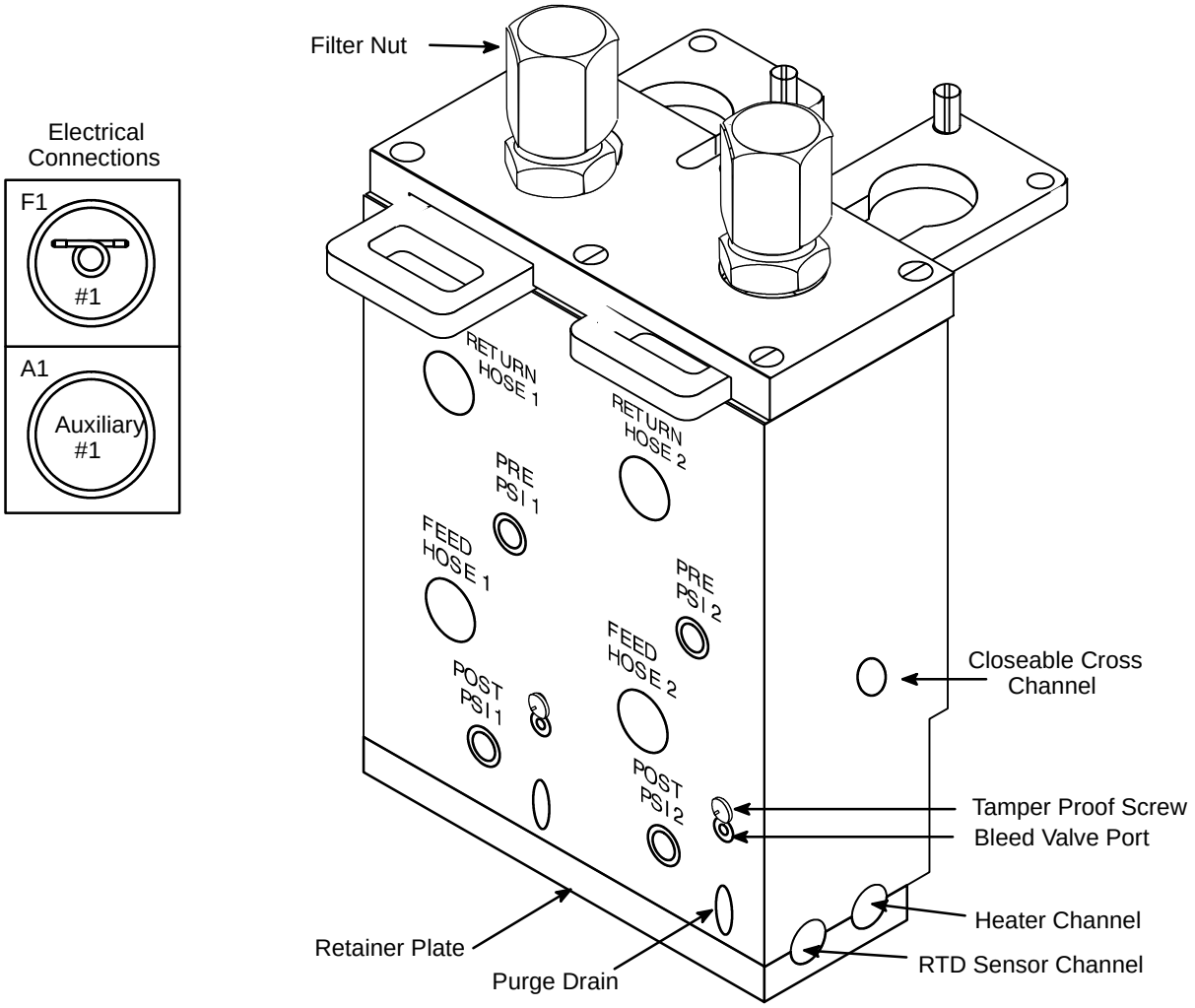
Zone 1	Grid 1 (optional)	5000w
Zone 2	Grid 2 (standard)	5000w
Zone 3	Hopper (standard)	10000w
Zone 4	Primary Filter (standard)	2000w



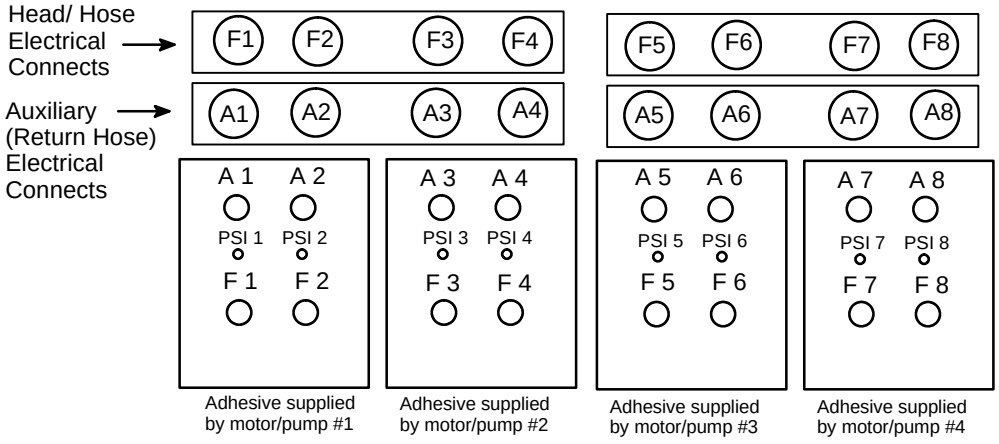
DM140 Dual Hopper Temperature Zones:

Zone 1	Grid 1 (optional)	2500w
Zone 2	Grid 2 (standard)	2500w
Zone 3	Grid 3 (optional)	2500w
Zone 4	Grid 4 (standard)	2500w
Zone 5	Hopper 1 (standard)	5000w
Zone 6	Hopper 2 (standard)	5000w
Zone 7	Primary Filter 1 (standard)	1000w
Zone 8	Primary Filter 2 (standard)	1000w

Dynamelt M70/140: Layout of Pumps & Hopper Temperature Zones (View from Pump Side)



Hose/ Head Electrical and Adhesive Connections


Head/ Hose Electrical Connects
Auxiliary (Return Hose) Electrical Connects
F1 F2 F3 F4 F5 F6 F7 F8
A1 A2 A3 A4 A5 A6 A7 A8
A 1 A 2
PSI 1 PSI 2
F 1 F 2
A 3 A 4
PSI 3 PSI 4
F 3 F 4
A 5 A 6
PSI 5 PSI 6
F 5 F 6
A 7 A 8
PSI 7 PSI 8
F 7 F 8
Adhesive supplied by motor/pump #1
Adhesive supplied by motor/pump #2
Adhesive supplied by motor/pump #3
Adhesive supplied by motor/pump #4

Up to Four Filter Blocks with up to 16 Adhesive Ports

Note:
Always connect Auxiliary (Return) Hose #1 (A1) to Auxiliary Electrical Connect #1 (A1), Feed Hose #1 (F1) to Feed Electrical Connect #1 (F1), etc. as described on page 3-3.

Dynamelt M70 & M140: Electrical Connection and Filter Manifold Arrangement for Maximum Head/ Hose Configuration

Adjusting the Pressure Relief Valve

The function of the pressure relief valve is to protect the gear pump(s) and the pump drive components from overload and to protect other components from potentially damaging pressure levels. The system will allow pressures up to 1000 PSI, however, typical factory settings are 500 PSI.

WARNING HIGH PRESSURE

NOTE: The following procedure will require the hot melt adhesive to be at a high temperature and the application system to have substantial pressure. Safety glasses, insulated gloves and long-sleeved protective clothing must be worn to prevent the possibility of serious injury from the molten adhesive. Refer to Chapter 1 and the section entitled "SAFETY PRECAUTIONS" for further details and First Aid information.

To Adjust Pressure Relief:
Note: This adjustment should be done with a melt pressure gauge or a pressure transducer installed. Failure to use proper equipment can result in excessive pressure levels.

1. Turn the application system ON and raise the temperatures of all components to normal operating temperatures.

Note: Position a bucket or other waste receptacle under the applicator(s) so that adhesive will be collected during the adjustment procedure.

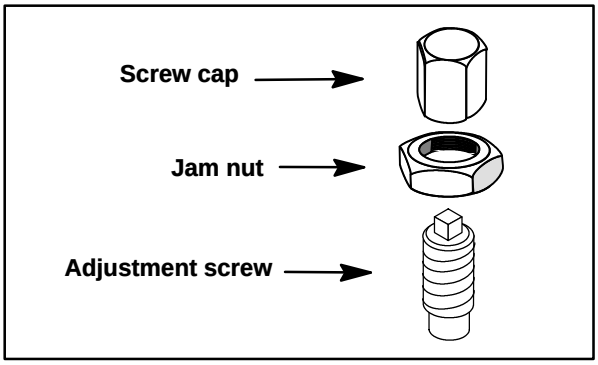
2. At the controller, set the motor speed to "0" so that the gearmotor is not turning.

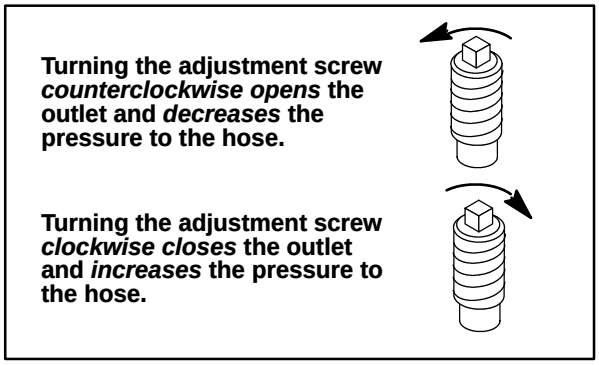
3. Locate the pressure relief assembly on the filter manifold (where the hoses attach to the ASU) and remove the access cover. Note: it is not necessary to remove the Lower Manifold Cover

4. Position a heat-resistant container below the manifold. With a hex key screwdriver (allen wrench), slowly loosen the manifold's two purge set screws (do not attempt to remove them). Allow adhesive and pressure to escape out of the manifold. Adhesive will drain into the container.

5. Remove the adjustment screw cap (see diagrams below) and loosen the jam nut. Turn the adjustment screw counter-clockwise until it is two turns from being completely out of the filter plug. *Note: if the adjustment screw comes out of the filter plug, be prepared for some adhesive to flow out of the screw hole.*

cont.




Turning the adjustment screw *counterclockwise opens* the outlet and *decreases* the pressure to the hose.
Turning the adjustment screw *clockwise closes* the outlet and *increases* the pressure to the hose.

6. At the controller, turn the motor ON to its maximum operating speed.

7. Actuate (open) the valves on the applicator(s) in order to fill them with adhesive and purge air from the system.

8. Close the valves (those openend in the last step) to stop the flow of adhesive.

9. Using a wrench, turn the adjustment screw clockwise to increase the pressure to the applicator(s).

CAUTION: Approach desired pressure with caution. DO NOT TURN THE ADJUSTMENT SCREW COMPLETELY CLOCKWISE (BOTTOMING IT INTO THE PLUG), since this would shut off the pressure relief channel and could cause extensive damage to the pump, motor and seals. Be aware that the higher the adjusted pressure, the more sensitive the adjustment is (i.e., at higher pressures, smaller adjustments to the screw will make larger changes to actual pressure).

10. After desired pressure is achieved, tighten the jam nut down onto the adjustment screw and lock it in place.

11. Replace and tighten the adjustment screw cap.

12. While the motor is operating at maximum speed, observe the adhesive flow from the applicator(s).

13. Reduce the motor speed, in increments of about 10%, until the adhesive flow begins to decrease.

Note: Though the speed of the motor is reduced, there will be no change in the amount of adhesive flow coming out of the applicator. This is because the pressure relief is designed to allow only a maximum adhesive pressure regardless of the motor speed past a certain point.

Then, increase motor speed in smaller increments (1 to 5%) until adhesive flow returns to the desired amount.

Note: This is the optimum point of operation for the motor, pump and pressure relief. It will also facilitate the best system performance and reduce wear on these components.

The application system is now adjusted for normal operation.

14. Re-tighten the two purge screws and re-install the access cover.

Pump Enable (Ready) Thermostat Calibration

The Pump Enable (Ready) Thermostat is preset to 132°C (270°F), unless the customer has specified a different preset temperature on his original ASU order. Generally, the pump enable thermostat is set approximately 30°C (50°F) lower than the application setpoint.

If a different temperature is desired, use the following procedure to re-calibrate the thermostat. *Note: The thermostat must be re-calibrated and the controller's pump enable temperature must be re-programmed.*

CAUTION: DO NOT set the pump enable thermostat lower than the softening point of your adhesive or pump damage may result.

As an example: the operator desires to lower the preset Pump Ready temperature to 107°C (225°F).

1. At the controller keypad, set the hopper temperature to the temperature at which you want the pump to start, i.e. 107°C (225°F).

2. Open the heater access door after loosening its captive screw.

3. Wait for the hopper temperature to stabilize at 107°C (225°F), then:

   a. *For thermostats with purple & black wire leads or solid tan wire leads:* turn the thermostat's adjustment screw counter-clockwise to increase the temperature (or clockwise to decrease it) until the pump's motor begins turning. Adjust no further.

   b. *For thermostats with tan (with tracer) wire leads:* turn the thermostat's adjustment screw clockwise to increase the temperature (or counter-clockwise to decrease it) until the pump's motor begins turning. Adjust no further.

4. Close the heater access cover and tighten its captive screw.

5. At the keypad, re-set the hopper's temperature to its correct "run" temperature.

6. Re-program the controller's pump enable temperature to 107°C (225°F) (refer to Ch 5).

Field Installation of Controller Options

Customers who choose to modify their adhesive supply unit with ITW Dynatec or Allen-Bradley manufactured options should assure that only qualified technicians perform such installations.

Before controller options are installed, always turn the controller's main power switch OFF. In most cases, turning the controller OFF will assure that the controller will retain its programmed parameters and configuration. Re-booting is not necessary.

Installation of an Optional Tach Generator or a DC Tracking Signal

The installation of a tach generator or a similar DC tracking signal allows speed tracking of the gear pump through voltage following. Multiple motors may be wired in parallel to the tach generator. On the controller, voltage following is referred to as the "AUTO" Mode of the motor control.

Installation Procedure

DANGER HIGH VOLTAGE

Dynamelt systems use electrical power that can be life threatening. Disconnect and lock out input power to the application system before starting any installation procedures.

1. Disconnect and lockout input power to the application system.

2. Open the panel box and locate the Allen Bradley analog input card (see panel box layout in Chapter 11).

3. A. To install a tach generator:
   i.Verify the tach generator's voltage polarity and connect it to the analog input card's terminals per the schematic in Chapter 11.

   ii. Verify that the gear pump motor is running at full speed when set to 100% in MANUAL mode (this is normally 180 VDC at the pump motor armature). The output of the tach generator can be adjusted, depending on the application, but it must be at least 10 VDC to obtain full adhesive gear pump speed.

   Note: under no conditions will the motor ever run faster than this speed (100% Manual).

   B. To install a similar DC tracking device (not a tach generator):
   Connect the DC tracking voltage signals to the AllenBradley analog input card per the schematic in Chapter 11.

   Note: the tracking voltage must be at least 0-10 VDC, but not more than 0-25 VDC.

4. Close the ASU's panel box door.

5. Re-connect input power and restore the application system to normal operation.

Optional Level Controls

The level control device informs the ASU's operator, via a "Level Low" or "Level High" message on the controller's System Status display, that the ASU's hopper needs to be refilled or that it is overfull. It may also be wired to stop production.

Single Point Level Control

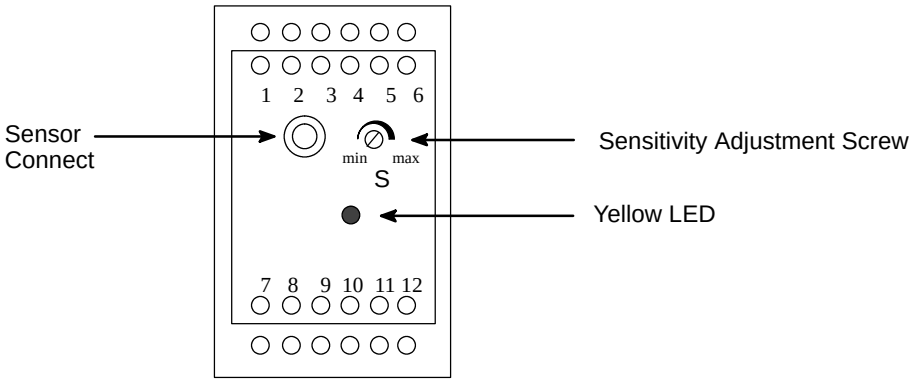
The single point level control monitors either a low or a high adhesive level.

The capacitive sensor is mounted in the hopper. The sensor cable is plugged into an amplifier. DO NOT CUT the sensor cable.

Adjustment of the Single Point Level Control:
To adjust the adhesive level control's sensitivity, access the control's amplifier, located inside the panel box assembly. On the amplifier (diagrammed below) is a sensitivity adjustment screw.

Turn the screw clockwise to increase sensitivity (or counter-clockwise to decrease). The yellow LED lights to indicate the presence of adhesive. When the LED goes out, the audible and visible alarms will activate.

Use of Two Level Controls in One Hopper:
Two single point level controls can work together to maintain a range of adhesive in the ASU's hopper. In this application, one level control's sensor is mounted at the level of high adhesive and the other is mounted at the low level. Each amplifier requires its own sensitivity adjustment.



Amplifier

Multi-Point Level Control (available on DM M140 only)

Refer to the level control manufacturer's manual for complete instructions on its setup and operation.

The multi-point level control has the capability for three separately calibrated outputs. However, for most applications, one output, calibrated with a high and a low level, is sufficient.

The two other outputs may be used as safeties (such as "critical high" and "critical low") for multi-ASU systems with bulk feeders.

Typical Start-Up and Shut Down of the DYNAMELT M Application System

The following simplified sequence assumes that the PanelView controller has been programmed.

Start Up Procedures

1. Fill the ASU's hopper with clean hot-melt adhesive to within a couple of centimeters (inches) of the top of the hopper. Close the hopper lid immediately to prevent contaminants from falling in. (Cover your bulk supply of adhesive to prevent contaminants also.)

2. Switch ON the Main Disconnect (the circuit breaker located on the panel box).

3. At the controller keypad, press the Heater Power ON/ OFF button. The display will read "System Heating".

4. Allow adequate time (approximately 20-30 min.) for the adhesive to melt and the temperatures of the temperature zones to stabilize. Monitor the display until it reads "System Ready", indicating that all temperature zones are up to ready temperature.

5. When temperatures are ready, the motor is enabled to pump adhesive.
   a. *If Motor is in Auto Program:*
      i For systems with no clutches installed: Adhesive will begin to pump when the production line begins to operate.
      ii. For systems with clutches installed:
      Press Motor Menu. Press desired Motor # Setup. Toggle Clutch ON. (If other motors are desired to run, repeat by pressing Return, press a desired Motor # Setup, toggle Clutch ON, etc.) Adhesive will begin to pump when the production line begins to operate.

   b. *If Motor is in Manual Program:*
      i. Press Motor Menu.
      ii. Press desired Motor # Setup.
      iii. Press Manual button.
      iv. Enter desired pump speed.
      v. If motor is installed with a clutch, toggle Clutch ON.
      vi. If other motors are desired to run, press Return, then repeat steps "ii" thru "v".
      v. Adhesive will begin to pump after ready condition is attained.

6. Return the PanelView controller to its Main Menu/ System Status Screen while ASU is operating, to monitor potential alarms.

Shut Down Procedures

If Motor is in Auto Program:

1. a. When the production line stops, the motor(s) will automatically stop, *or*
   b. Turn OFF the motor(s) manually by pressing the Motor Menu, press desired Motor # Setup, then press OFF. Repeat for each motor in the system.

2. a. Toggle Heater Power* OFF (on Main Menu), *or*

cont.

b. If all power is to be removed, turn OFF the ASU's Main Disconnect Switch.

If Motor is in Manual Program:
1. Turn OFF the motor(s) by pressing the Motor Menu, press desired Motor # Setup, then press OFF. Repeat for each motor in the system.

2. a. Toggle Heater Power* OFF (on Main Menu), *or*
   b. If all power is to be removed, turn OFF the ASU's Main Disconnect Switch.

**Note: If the Seven-Day Scheduler is employed, turn off with Heater Power key only.*

Storage and Disposal of the DYNAMELT M Application System

Temporary Storage of the Unit

1. Flush the adhesive application system with flushing fluid (PN L15653), following the instructions detailed in chapter 6 of this manual.

2. Clean or replace both the outlet filter and the primary filter, following instructions detailed in chapter 6.

3. Shut OFF all pressure and power sources.

4. Release residual air pressure (if applicable).

5. Remove all residual adhesive and wipe components clean.

6. Remove all air lines (if applicable) and all power supply cables.

7. Pack the unit in a corrosion-proof manner.

8. Store the unit in such a way that it is protected from damage.

Disposal of the Unit

1. Shut OFF all pressure and power sources.

2. Release residual air pressure (if applicable).

3. Remove all residual adhesive.

4. Remove all air and adhesive hoses and all power supply cables.

5. Dismantle all components and sort into mechanical and electrical components.

6. Arrange for all components to be recycled.

Chapter 4
CONTROLLER SET-UP

PLC Logic Requirements

IMPORTANT NOTE: To Customers who supply PLCs (programmable logic computers) to operate ITW Dynatec adhesive application systems –

ITW Dynatec's product warranty is in effect only if the following safeguards are written into the logic of customer-provided PLCs:

WARNING

Any software deviations from the following may cause unsafe conditions, including fire, in the hopper, hoses and applicators.

1. Shorted and open sensors must open the main heater contactors.
2. Shorted and open sensors must stop all pump motors.
3. The under-temperature switch must stop all pump motors.
4. The under-temperature alarms must stop all pump motors.
5. The over-temperature switch must stop all pump motors.
6. The over-temperature switch must open the main heater contactors.
7. The over-temperature alarms must open the main heater contactors.
8. The E-stop and the auxiliary disconnect must stop all pump motors.

DANGER HIGH VOLTAGE

Never open the control panel without switching off the main disconnect switch to ensure that it is disconnected from its power source.

Temperature Control Functions in General

The microprocessor-based proportional temperature controller in the ASU performs a number of functions that help to maintain adhesive setpoints in all temperature zones of the DYNAMELT® system. It maintains permanent system values (fixed proportional and integration values that have been programmed at the factory). It enables the user to program temperature settings and heater on/off sequencing that are appropriate to a specific application. It displays programmed values, and it includes self-diagnostic malfunction alerts and failure alarms. *Note: Some controller functions are direct temperature conversions between degrees Celsius and Fahrenheit. Other parameters are independently selected values.*

Defining Temperature Control Terms

Adhesive Temperature Control Range
The temperature limits within which the ASU, hoses and applicators may be programmed and maintained.

Error Indication Alarms
Alarms which indicate that the programmed over-temperature values have been exceeded for one or more hopper, hose or head zones. Alarms may also indicate an open or short-circuited sensor.

External Reference Percent
The numeric percentage of the parent line's full speed. Used in the controller's Auto mode only.

Heater Output Percent
Heater output fluctuates in order to maintain each temperature zone's setpoint. Heater output is measured as a percentage of the full wattage of each individual heater.

Heating Sequence Priority
A program which allows certain temperature zones (those assigned priority "1") to begin heating first, before other zones (those assigned priority "2" or "3") in the system. See also the definition of "Sequential Heating".

High/ Low Alarms (BW + / -)
The high/ low alarm setpoints. This is a range (bandwidth) "+" and "-" a zone's temperature setpoint. For example, if the temperature setpoint is 200 degrees, and the high/ low alarm setpoint is 10 degrees, then the high alarm equals 210 degrees and the low alarm equals 190 degrees.

Mechanical High-Temperature Protection
A mechanical, redundant thermostat located on the ASU hopper that will turn OFF the system at 232°C (450°F).

Microprocessor-based Proportional Temperature Control
The built-in control system that controls, monitors and displays all system temperature values.

Over-Temperature Setpoint
The programmable temperatures that will cause display alarms to occur when those temperatures are exceeded. Power is disconnected, the READY contact opens and the alarm contact closes. If an external alarm has been connected (for example, to a PLC), it will activate. The over-temp setpoint is the upper limit of the ready temperature range of each zone.

Pump Enable Temperature
The pump enable temperature protects the pump, pump shaft, motor and motor control board from damage by not allowing the pump to activate until a low limit (the programmed pump enable temperature) is achieved. The pump enable thermostat is manually calibrated.

RS232/ RS485 Serial Communication

A bi-directional data transfer connection to a remote computer which enables system parameters to be monitored and/ or controlled from the remote station. The RS485 serial port connection allows remote interface over a much longer distance than the RS232 connection.

RTD Sensors

The standard Dynamelt system uses 100-ohm platinum resistance temperature detector sensors (RTDs) to read temperatures for all the system's temperature controls. As an option, the unit can be configured for 120-ohm nickel sensors.

Ready Temperature

The programmable temperature which allows the ASU pump to turn ON. The ready temperature range is a deviation (±) from the setpoint. The setpoint minus the deviation is the low limit of the range, and the setpoint plus the deviation is the high limit of the range.

Sequential Heating

The heating sequence which allows the slower-heating hopper to reach operating temperature without unnecessary use of electricity for faster-heating hoses and applicators. Sequential heating is the time period during which the hoses and applicators remain OFF while the hopper (and optional drop-in grid) heats up. Hoses and applicators may be independently programmed. If hopper temperature is above ready temperature when the ASU is turned ON, the hose and applicator sequence is bypassed and they will be turned ON. Sequential heating is restored after Standby is turned from ON to OFF. Sequential heating is not needed for most applications and can delay total system warm-up time.

Setpoint

A user-selected temperature that has been programmed for each heating zone of the adhesive application system.

Setpoint Limitation

This is a universal maximum temperature for all zones. The programmer cannot program a temperature setpoint higher than the setpoint limitation.

Seven-Day Scheduler

A controller feature that provides for the scheduling of OFF and ON times ("events") for the adhesive application system. It therefore allows the operator to program heating cycles which coincide with the work week's production schedule. The scheduler also helps conserve electricity and functions as an additional safety feature.

Standby

The system condition where the ASU, hose and head temperatures are maintained at predetermined reduced temperatures. Standby temperatures are set lower than setpoint temperatures in order to reduce adhesive degradation and energy consumption when the system is temporarily inactive, and to permit rapid system warm-up when run condition is selected.

Temperature Zone Enable

The temperature zone enable allows the operator to disable unused temperature zones in such a way that they do not ever appear on the controller's display and heating is switched OFF.

Trim Percent

The desired ratio of the parent machine's pump motor speed to the external reference percent as programmed. Used in the controller's Auto mode only.

Error Indication Alarms

The conditions that will trigger an alarm are:

- When a hopper, hose or head has exceeded its selected over-temperature setpoint, which is the setpoint plus its high/low alarm setting, or when it is below its selected under-temperature setpoint, which is the setpoint minus its high/low alarm setting.
- When a hopper, hose or head sensor has an open circuit.
- When a hopper, hose or head has a heater with a short circuit.

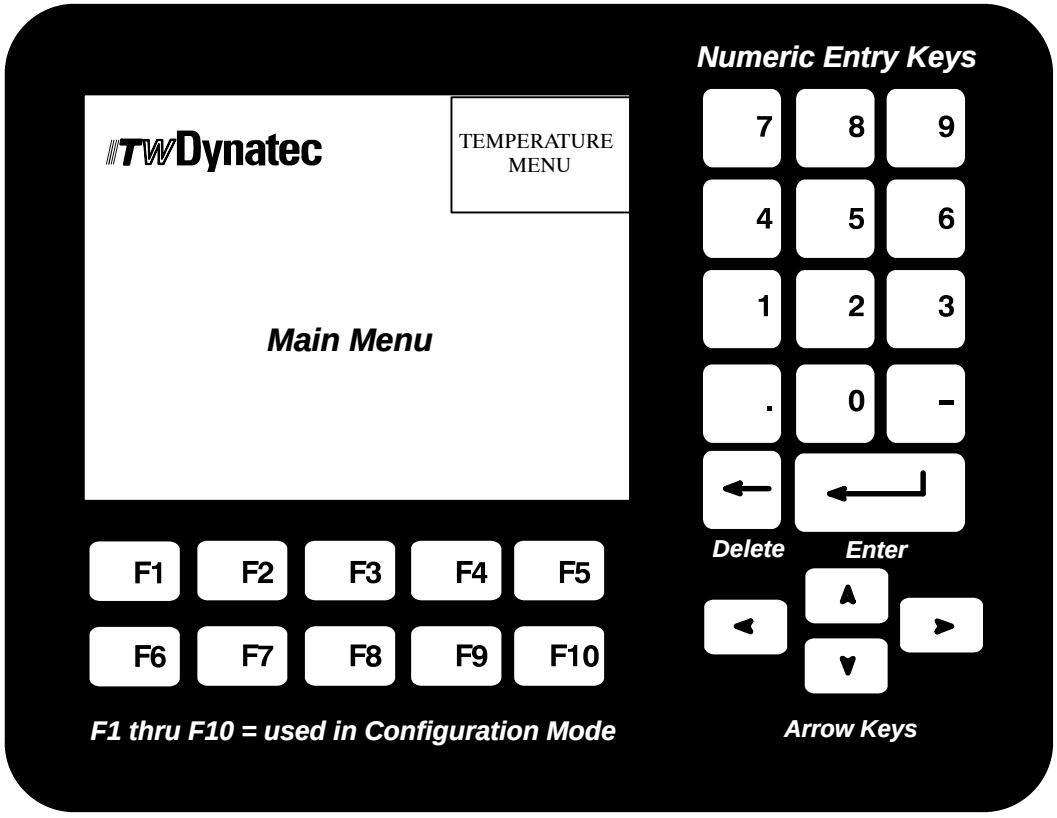
Settings for a Typical Operation

Note: The values given here are approximate settings for a typical packaging operation. The values you choose will be based on the type of equipment and adhesive you are using and the nature of your particular operation.

If Application Temperature is 177°C (350°F):

- Hose and head temperature: 177°C (350°F).
- Hopper setpoint temperature: 163°C (325°F).
- Hi/ Lo limit deviation: 12°C (20°F).
- ASU operating range: 149°C to 177°C (300°F to 350°F).
- Standby condition temperature (deviation): 30°C (50°F).
- Hopper over-temperature setpoint : 177°C (350°F)
- Mechanical thermostat (for the hopper) over-temperature: 219°C (425°F)

Chapter 5
PANELVIEW 600
CONTROLLER TOUCHSCREENS
PROGRAMMING MANUAL 10.02



Controller Screens in General

1. To progress through the controller's screens, press within the box (key) of a desired description (function) on the touchscreen. For example, as seen above, to go to the "Temperature Menu", press within the "Temperature Menu" box located at the upper right corner of the touchscreen.

2. Once a function is selected (active), use the numeric entry keys to program a desired value. Press the Enter arrow (on the numeric entry keypad) to enter your value.

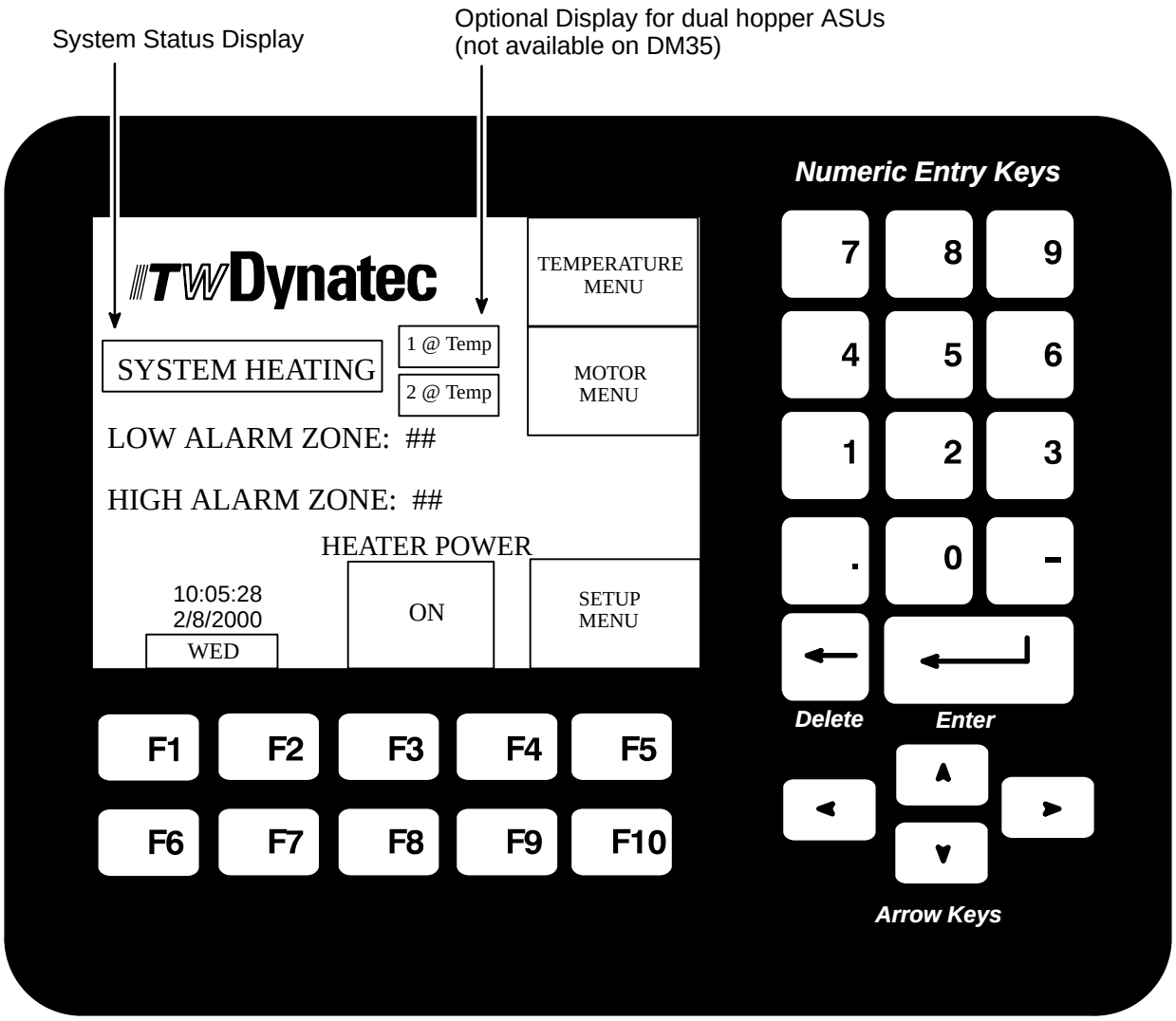
3. The "Delete" arrow (located below the numeric keypad, see above) also serves as an "escape" key.

4. This chapter describes a typical system. Your ASU may have more or less temperature zones, motor/ pumps, clutches or pressure transducers installed.

5. To go to "PanelView Configuration", press the left and right arrow keys (lower right of diagram) simultaneously. See pages 18 thru 20 of this chapter for details on Configuration Mode.

6. To close an error screen, touch it.

Main Menu Screen



Use of the Main Menu/ System Status Screen

Press This Function Key	**To:**
Heater Power	Toggle Heater Power ON or OFF
Temperature Menu	Go to the Temperature Menu Screen
Motor Menu	Go to the Motor Menu Screen
Setup Menu	Go to the Setup Menu Screen

Use of the Main Menu/ System Status Screen, cont.

Programming Sequence

1. Press Heater Power to turn the Heater (Main) Power ON or OFF.
2. Press Setup Menu to setup the system in Celsius/ BAR or Fahrenheit/ PSI (screen is diagrammed on page 14 of this chapter).

Note: after temperature zone and motor programming is complete, if desired, you may return to this screen to program the Standby and Seven Day Scheduler

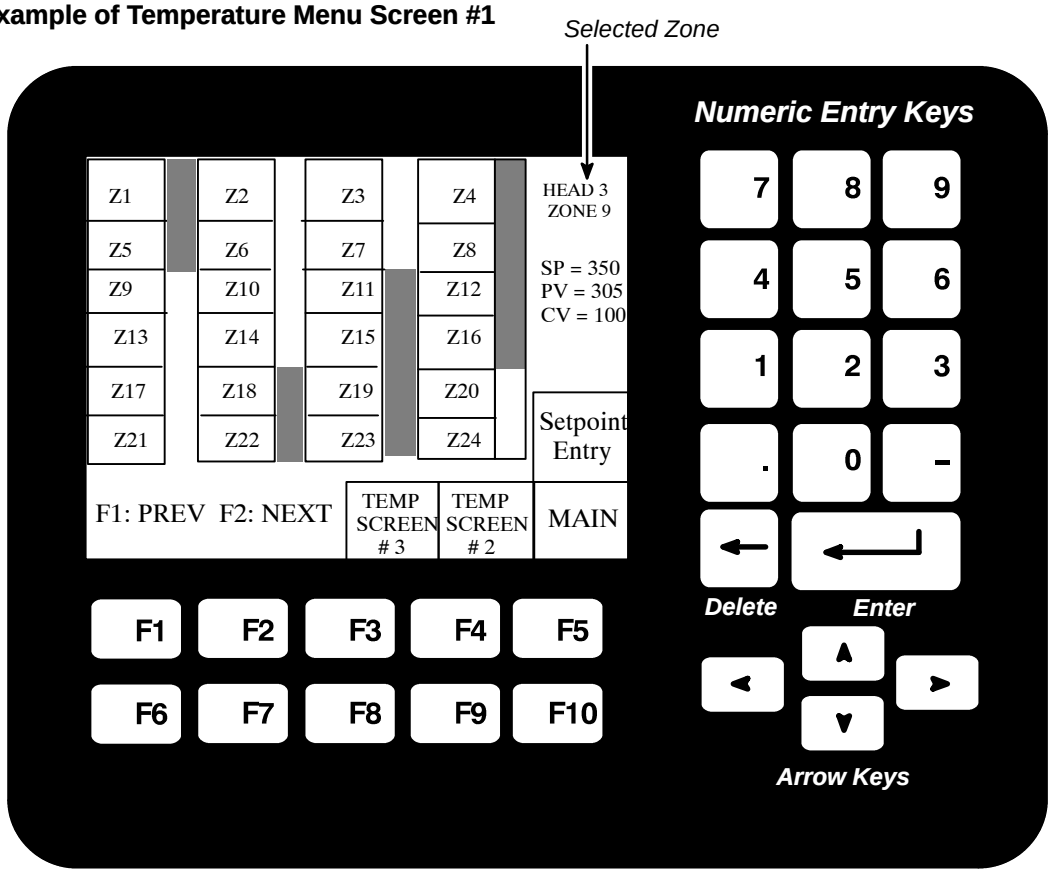
3. Press Temperature Menu to choose a temperature zone. Then program or monitor the following temperature functions (see details beginning on page 4 of this chapter):
    a. Temperature setpoints
    b. High/ low alarms
    c. Heater output
    d. Actual temperature
4. Press Motor Menu to:
    a. Choose a motor. Then setup or monitor the following functions for each motor:
        i. Motor ON/ OFF, Manual or Auto
        ii. Pump speed
        iii. Motor rpm
        iv. External reference percent (Auto mode only)
        v. Minimum pump rpm (Auto mode only)
        vi. Maximum pump rpm (Auto mode only)
    b. Monitor adhesive pressure (PSI/ BAR), or
    c. Turn clutches ON or OFF.
5. Press Setup Menu to program System Standby and/ or Seven-Day Scheduler.

Monitoring:

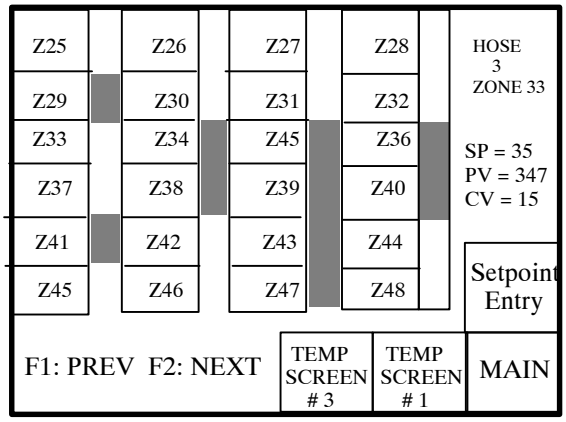
1. "System Status Display" describes system status as one of the following:
    a. System Initializing: seen immediately after a power on, this screen is of short duration. It indicates that the controller is booting up.
    b. System OFF
    c. System Heating: power is ON but zone temperatures have not risen to setpoint.
    d. System Ready: all zones have reached setpoint temperatures.
    e. High Alarm: a temperature zone has exceeded its high limit.
    f. Standby: the system is in a programmed standby state. Display flashes when Standby is active (ON).
    g. Remote E Stop: the system has been stopped by a remote emergency stop.
    h. Level Low: adhesive level in the hopper is low (used with optional level control only).
    i. Level High: adhesive level in the hopper is overfull (used with optional level control only) .
    j. OT T'stat Open: hopper temperature has exceeded safety limit (232°C/ 450°F).
    k. DeviceNet Fault: DeviceNet is not connected properly or is faulted (refer to pgs. 7-7 to 7-9).
    l. Drive # Fault: the system is not ready until all of the drives are ready. (This fault will clear itself out)
    m. Pump # Low (or High) Pressure (optional): transducers indicate that #'d pump has high or low pressure, due to a clogged filter, adhesive leak, excessive adhesive flow, etc.
2. Low Alarm Zone or High Alarm Zone: the controller will list, one at a time, the identification number of any zone with a low or high alarm (the identification numbers are assigned on each zone's Temperature Zone Programming screen). The i.d. numbers on the alarm display disappear as alarms clear.
3. Dual Hopper System Ready indicators: For ASUs with two adhesive hoppers, a display appears when each hopper is at ready temperature.
4. Error Screen: an error will cause this screen to appear. Touch within the error screen and it will disappear.
5. Seven-Day Scheduler's Time-of-Day Clock: clock must be set for scheduler to function. See "PanelView Configuration Screen" in this chapter for clock setting instructions.

Temperature Menu Screen

Example of Temperature Menu Screen #1



Example of Temperature Menu Screen #2: additional temperature zones (if applicable)



Temperature Menu Screen #3 (not shown): additional termerature zones (if applicable)

Use of the Temperature Menu Screen

Press This Function Key	To:
Z#	Program or monitor this numbered temperature zone
Main	Return to the Main Menu
Setpoint Entry	Go to the Setpoint Entry screen
F1 *or* F2	Go to the Previous *or* Next numbered zone
Temp Screen #2 *or* Temp Screen #3	Go to the second or third Temperature Menu screen for more zones (if applicable)

Programming

1. Press “Z1” to go to the first temperature zone screen. See the following two pages for programming instructions.
2. Press each of the zone keys to program each temperature zone in the same manner.
3. Press “Temp Screen #2” or press “Temp Screen #3” to program the zones on the other Temperature Menu screens (if applicable).

Notes:
1. Hoses are numbered according to the hose outlet each is connected to. For example, Hose #3 is the hose connected to the #3 hose outlet.
2. Your PanelView controller may have up to three Temperature Menu screens, depending on the number of temperature zones in your adhesive application system.

Monitoring

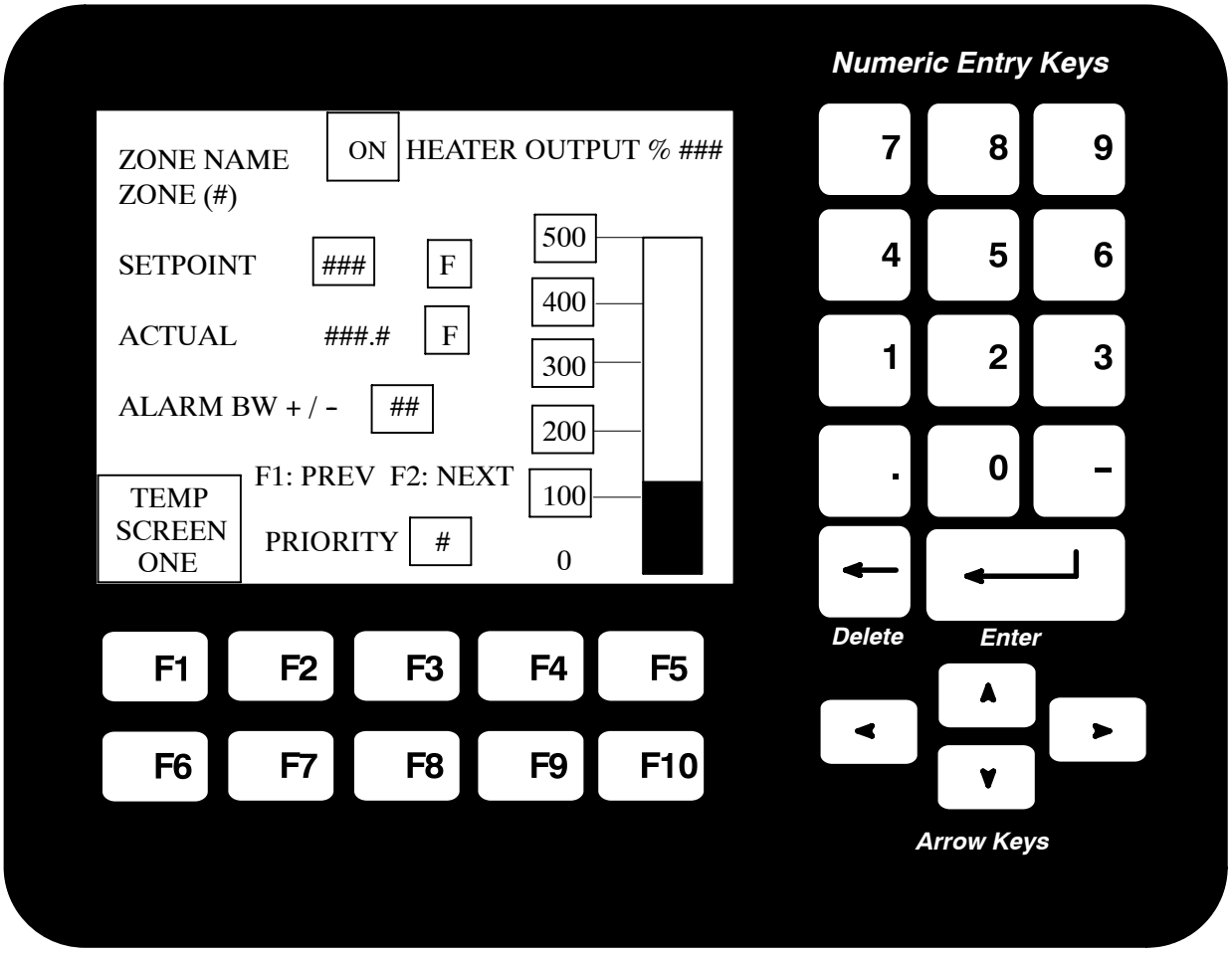
1. When selected. each temperature zone is displayed, in the upper right corner of this screen, with its identification number (ie. Zone 1, Zone 2, etc. or Z1, Z2, etc.) in addition to its name (ie. Prog Melt 2, Hose 3, etc.).
2. When selected, each temperature zone is displayed in the middle, right area of this screen, with its Setpoint (SP), Process Variable (PV) which represents the actual temperature and its Control Variable (CV) which represents the percentage of heater output.
3. A bar indicator to the right of each zone’s key signifies if the zone is currently ON (heating). The indicator appears “green” on the PanelView.

For example: Temperature Menu Screen #1, on the previous page, indicates the following zones are ON: Z1, Z4, Z5, Z8, Z11, Z12, Z15, Z16, Z18, Z19, Z22 and Z23.

Temperature Zone Limits

1. Model DM35 asu’s have up to 16 zones of temperature zone capability.
2. Model DM70 and DM140 asu’s have up to 32 zones of temperature zone capability.
3. Model DM210 asu’s have up to 46 zones of temperature zone capability.

Setpoint Entry Programming Screen(s)



For a list of the names/ numbers of the Temperature Zones for your system, see the electrical schematic in Chapter 11 and/ or the last page of this chapter.

Use of the Setpoint Entry Programming Screen(s)

Each of the temperature zones is programmed individually by using the function keys as follows:

Press This Function Key	To:
ON/OFF	Toggle zone ON or OFF
Setpoint ###	Program the zone's temperature setpoint
Alarm BW +/- ##	Program the zone's high and low alarm range
Priority #	Program a heating sequence priority for this zone
F1 *or* F2	Go to the Previous zone *or* the Next zone on active menu
Temp Screen 1 *or* 2	Return to a Temperature Menu

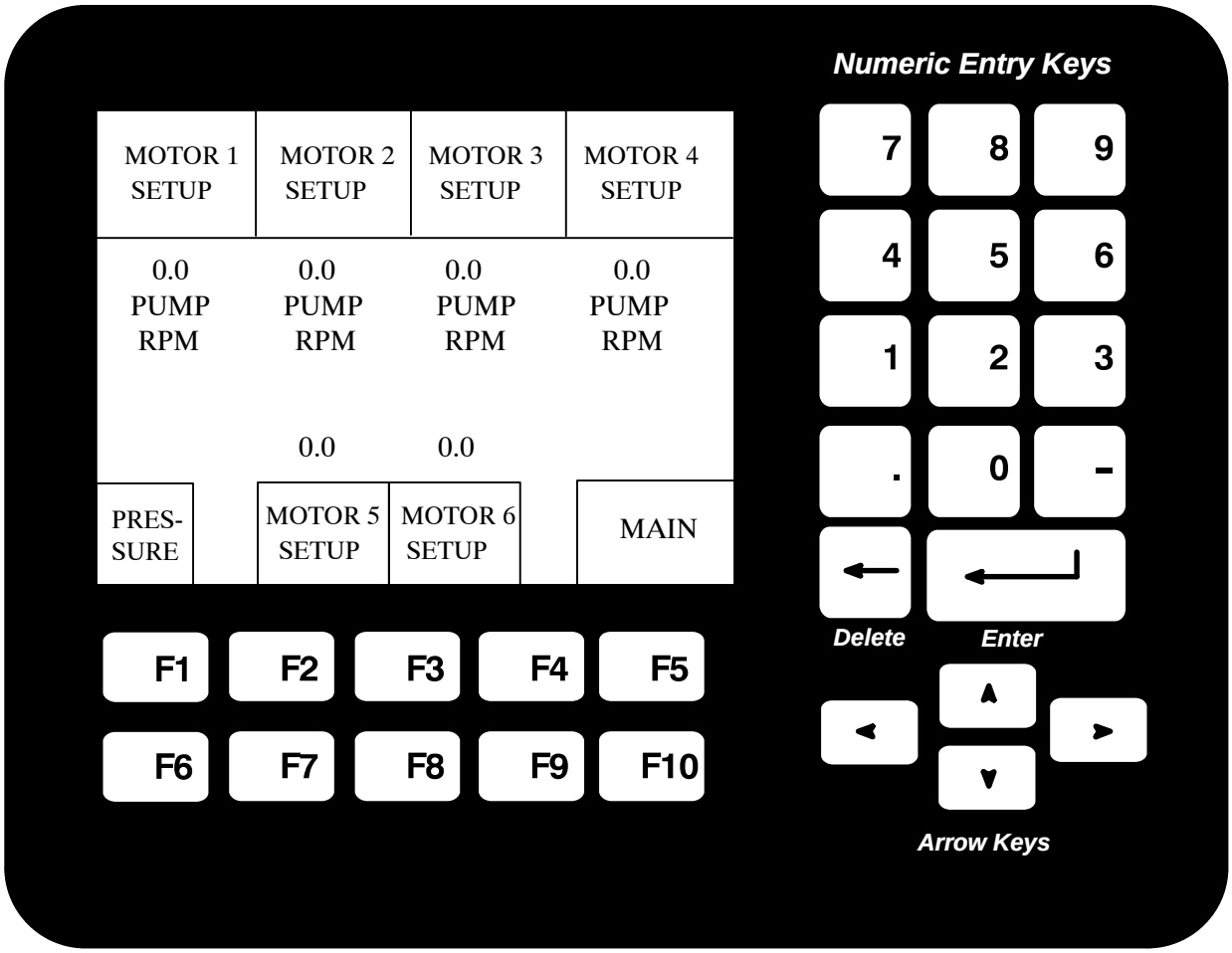
Programming

1. Toggle to turn the zone ON or OFF.
2. Press Setpoint ### to program the zone's temperature setpoint:
   a. Use the numeric keypad to enter desired setpoint value (0-450°F).
   b. Press the Enter arrow to store your desired value.
3. Press Alarm BW +/- ## to program the zone's high and low alarm value:
   Note: The high/ low alarm setpoint is a range (+ and – the zone's temperature setpoint). For example: if the temperature setpoint is 200 degrees, and the high/ low alarm setpoint is 10 degrees, then the high alarm equals 210 degrees and the low alarm equals 190 degrees.
   a. Use the numeric keypad to enter desired high/ low alarm range (10-50°F).
   b. Press the Enter arrow to store your desired value.
4. If a heating sequence priority is desired, press Priority #:
   Note: Priorities of "1", "2" or "3" are allowed. A priority "1" programs a zone to begin heating first, before other zones in the system. If no priorities are programmed, the controller will default to "1" for each zone, causing all zones to begin heating simultaneously.
   a. Use the numeric keypad to enter desired priority (1 thru 3).
   b. Press the Enter arrow to store your desired value.
5. Press Temp Screen 1 (or 2) and repeat programming steps for another temperature zone.

Monitoring

1. "Zone #" (in upper right corner): the number which appears here is the controller's identification number for this zone. This i.d. number will appear on the Main Menu screen any time the zone has a high or a low alarm.
2. Actual temperature may be viewed as:
   a. a line item of the display (for example, "Actual 117.5 F"), or
   b. a graph, located to the right in the display.
3. Heater output is measured as a percent of the full wattage for that heater. Heater output cycles on and off continuously in order to maintain each temperature zone setpoint.
4. Temperature setpoint is displayed as programmed.
5. High/ low temperature alarm is designated "Alarm BW +/- " and is displayed as programmed.
6. Zones that are OFF will be bypassed when pressing F1 (PREV) or F2 (NEXT).

Adhesive Application Unit's (ASU) Motor Menu Screen



Use of the ASU's Motor Menu Screen

Press This Function Key	To:
Motor 1 Setup	Program or monitor Motor #1
Motor 2 Setup	Program or monitor Motor #2 (if applicable)
Motor 3 Setup	Program or monitor Motor #3 (if applicable)
Motor 4 Setup	Program or monitor Motor #4 (if applicable)
Motor 5 Setup	Program or monitor Motor #5 (if applicable)
Motor 6 Setup	Program or monitor Motor #6 (if applicable)
Pressure (if applicable)	Monitor pressure values of (optional) pressure transducers
Main	Return to the Main Menu

Programming

There is a "Motor # Setup" screen for each motor installed on your system.
1. Press Motor 1 Setup to program the first ASU motor. See the following two pages for programming instructions.
2. If more than one motor is installed on your ASU, press each Motor Setup to program each one in the same manner.

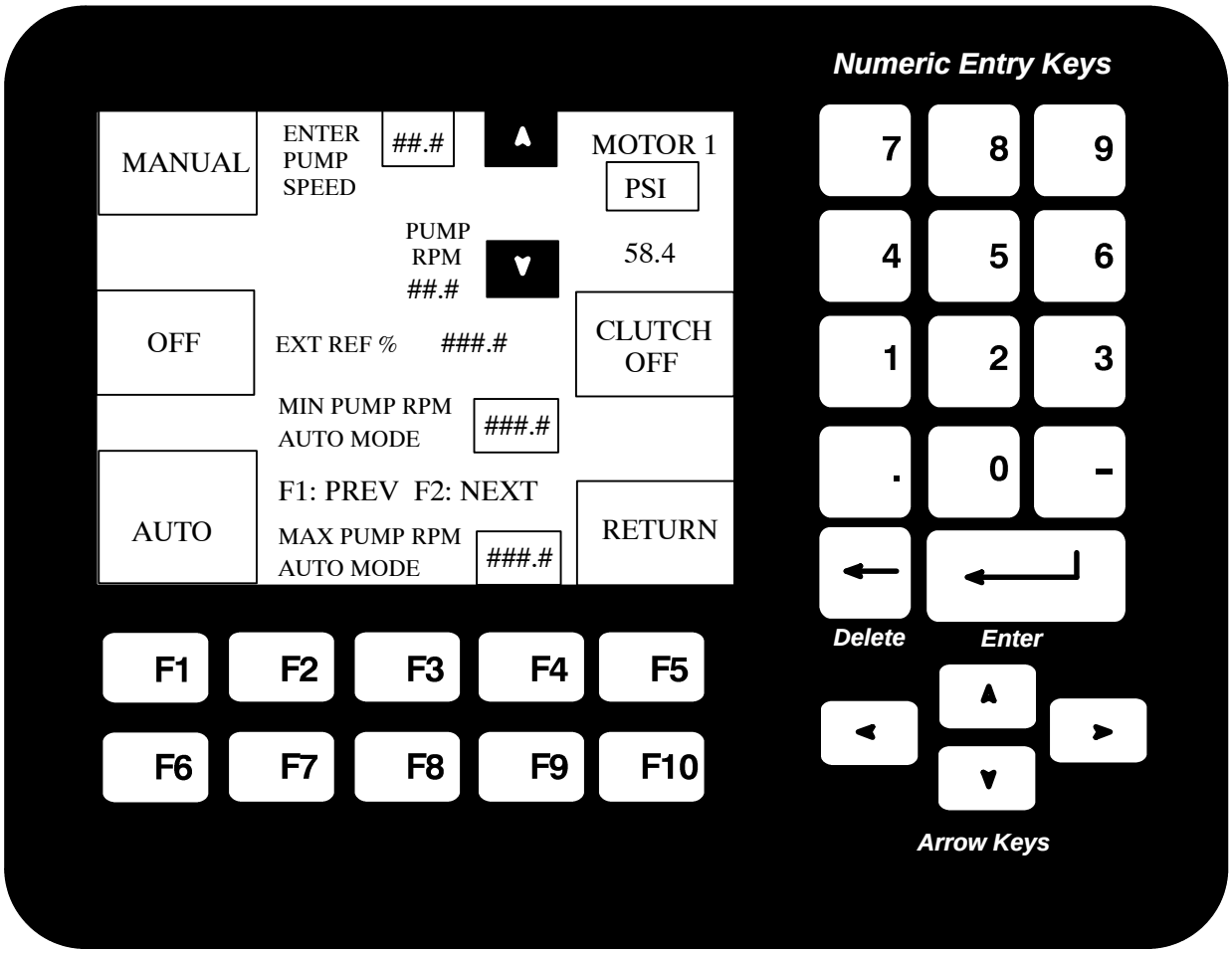
Monitoring

1. Actual Pump RPM is displayed for each motor.
2. If pressure transducers are installed on your ASU, press "Pressure" to advance to the Adhesive Pressure Monitoring screen (see pages 12 & 13 of this chapter).

Motor Limits

1. Model DM35 asu's may utilize one motor (only).
2. Model DM70 and DM140 asu's may utilize up to four motors.
3. Model DM210 asu's may utilize up to six motors.

Motor Programming Screen



Use of the Motor Programming Screen

Press This Function Key	To:
Manual	Choose Manual Mode
OFF	Choose Motor OFF
Auto	Choose Auto Mode
Enter Pump Speed ##.#	Program Pump Speed (used in Manual mode only)
Up & Down Arrows	Adjust Pump Speed up or down (used in Manual mode only)
Min Pump RPM	Enter desired minimum pump speed (used in Auto mode only)
Max Pump RPM	Enter desired maximum pump speed (used in Auto mode only)
Clutch (if applicable)	Toggle (optional) clutch ON or OFF
F1 *or* F2	Go to the Previous zone *or* the Next zone on active menu
Return	Return to the Motor Menu screen

Programming

1. Press Manual, OFF or Auto to choose desired motor mode.
2. If in Manual, press Enter Pump Speed ##.# to program pump speed:
    a. Use the numeric keypad to enter desired rpm value.
    b. Press the Enter arrow to store your desired value.
3. If in Auto:
    a. Press Min Pump RPM to program minimum pump speed. Enter and store value as above. At 0 volts, this value will be between 0 and 10 rpm.
    b. Press Max Pump RPM to program maximum pump speed. Enter and store value as above. At 10 volts, this value will be between 0 and 90 rpm, depending on motor installed on ASU.
4. Toggle (optional) Clutch ON or OFF. This key is present only if optional clutch(es) is installed.

Adjustments

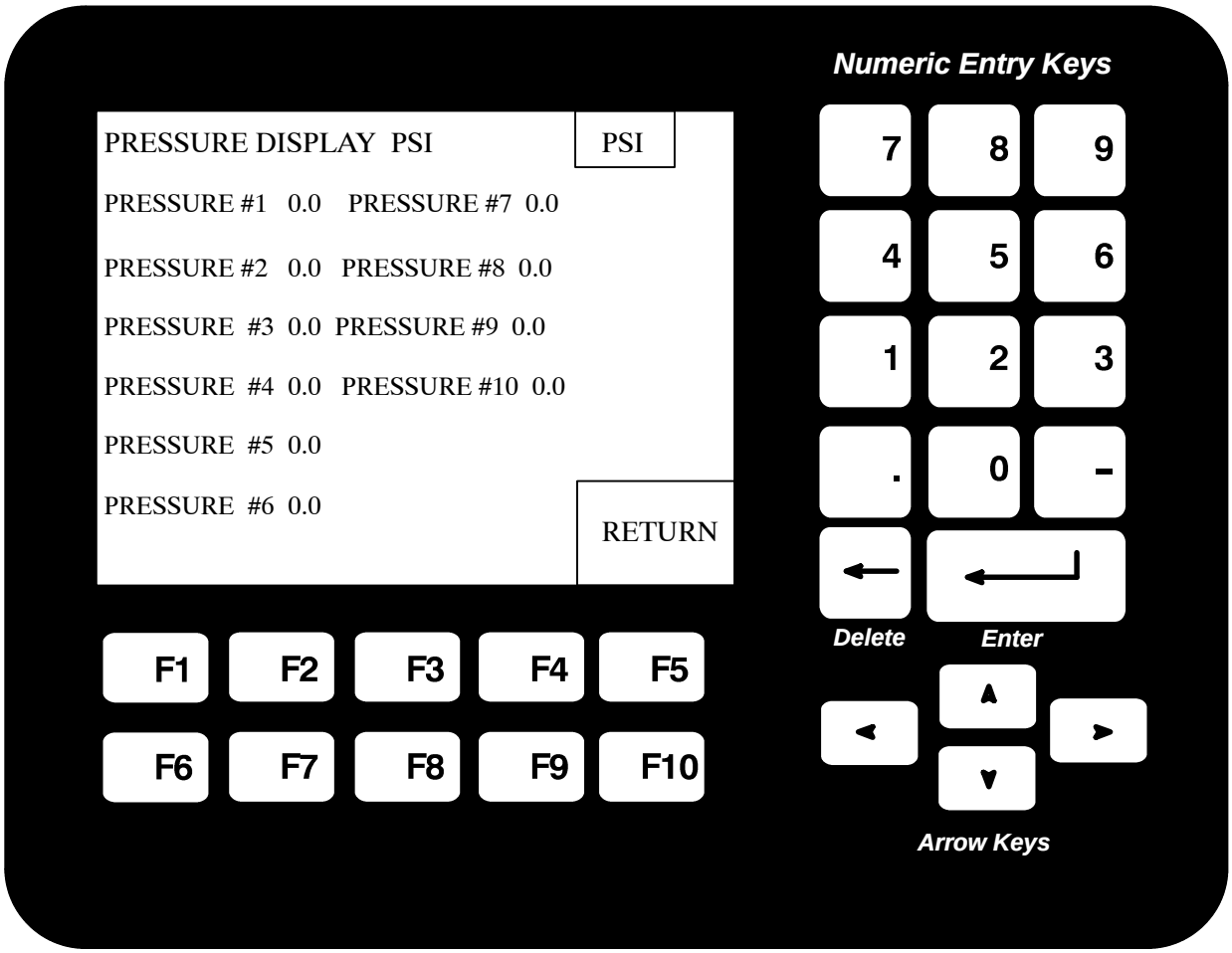
To adjust pump motor speed:

a. In Manual mode: use the upper set of adjustment arrows to ramp speed up or down.

Monitoring

1. Actual Pump RPM is displayed.
2. Ext Ref % (external reference percent): the percent of the parent line's full speed. Used in Auto mode only.
3. PSI or BAR is displayed as chosen on Setup Menu. The actual pressure is also displayed.

Adhesive Pressure Monitoring Screen



Use of the Adhesive Pressure Monitoring Screen

Note: this screen is functional only if optional pressure transducers are installed on your ASU.

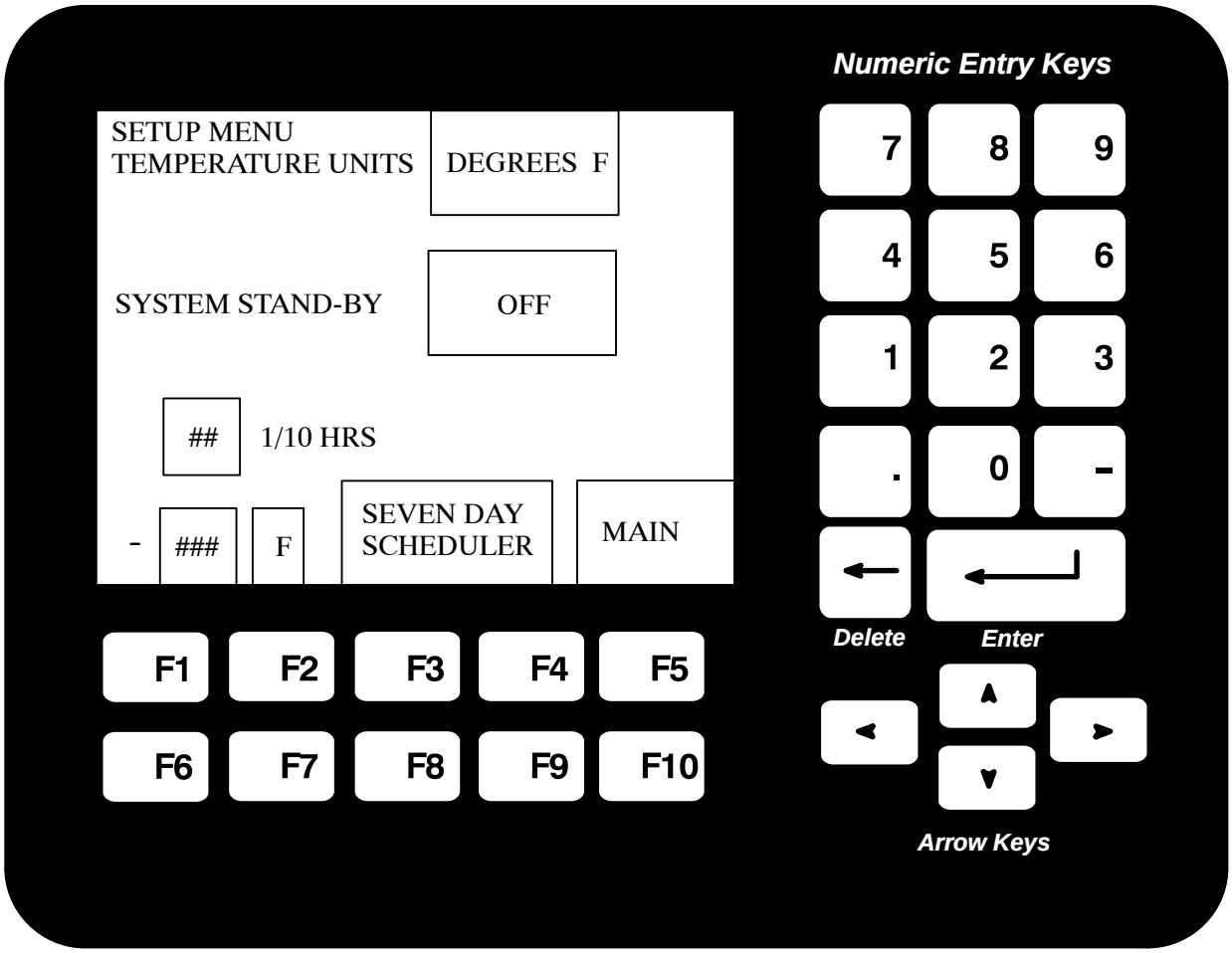
Press This Function Key	To:
Return	Return to the Motor Menu screen

This screen is read only.

Adhesive pressure is displayed as read by the system's pressure transducers installed on the ASU's outlet filter manifold.

Monitoring
Pressure is read as "PSI" or "BAR"; this selection is registered in the box at the top, right of screen. To change selection, go to Setup Menu screen.

Setup Menu Screen



Use of the Setup Menu Screen

Press This Function Key	To:
Temperature/ Pressure Units	Toggle to choose Celsius/ BAR or Fahrenheit/ PSI
OFF/ON	Toggle to choose System Standby ON or OFF
## 1/10 HRS	Program a Standby delay
– ### F or C	Program a Standby temperature reduction value
Seven Day Scheduler	Press to procede to Seven Day Scheduler programming
Main	Return to the Main Menu

Programming

1. Press Temperature/ Pressure Units to choose Celsius/ BAR or Fahrenheit/ PSI.
2. System Standby Programming:

"Standby" is a temperature value by which all temperature zones will lower when Standby mode is activated. For example, if your temperature setpoints are all 300 degrees, and you program a 100 degree Standby, then the Standby temperature of all zones will be 200 degrees. Similarly, if your temperature zones setpoints vary, and you program a 100 degrees Standby, each zone's Standby temperature will be 100 degrees lower than its setpoint. Standby must be programmed for the length of time before which these lowered temperatures start.

To Program:

a. Press ## 1/10 HRS to enter the number of tenths of a hour the system will delay before going into the standby condition (0 - 500). Press Enter.

Examples: A. Programming the number 10 here results in 1 hour delay (10/10 hour = 1).
B. Programming the number 4 here results in 24 minutes delay (4/10 hour = 24).

b. Press – ### F (or C) to enter the number of degrees below temperature setpoints desired for your standby temperature (0 - 200 degrees). Press Enter.

c. Toggle OFF/ON to turn System Standby ON or OFF. Press Enter.

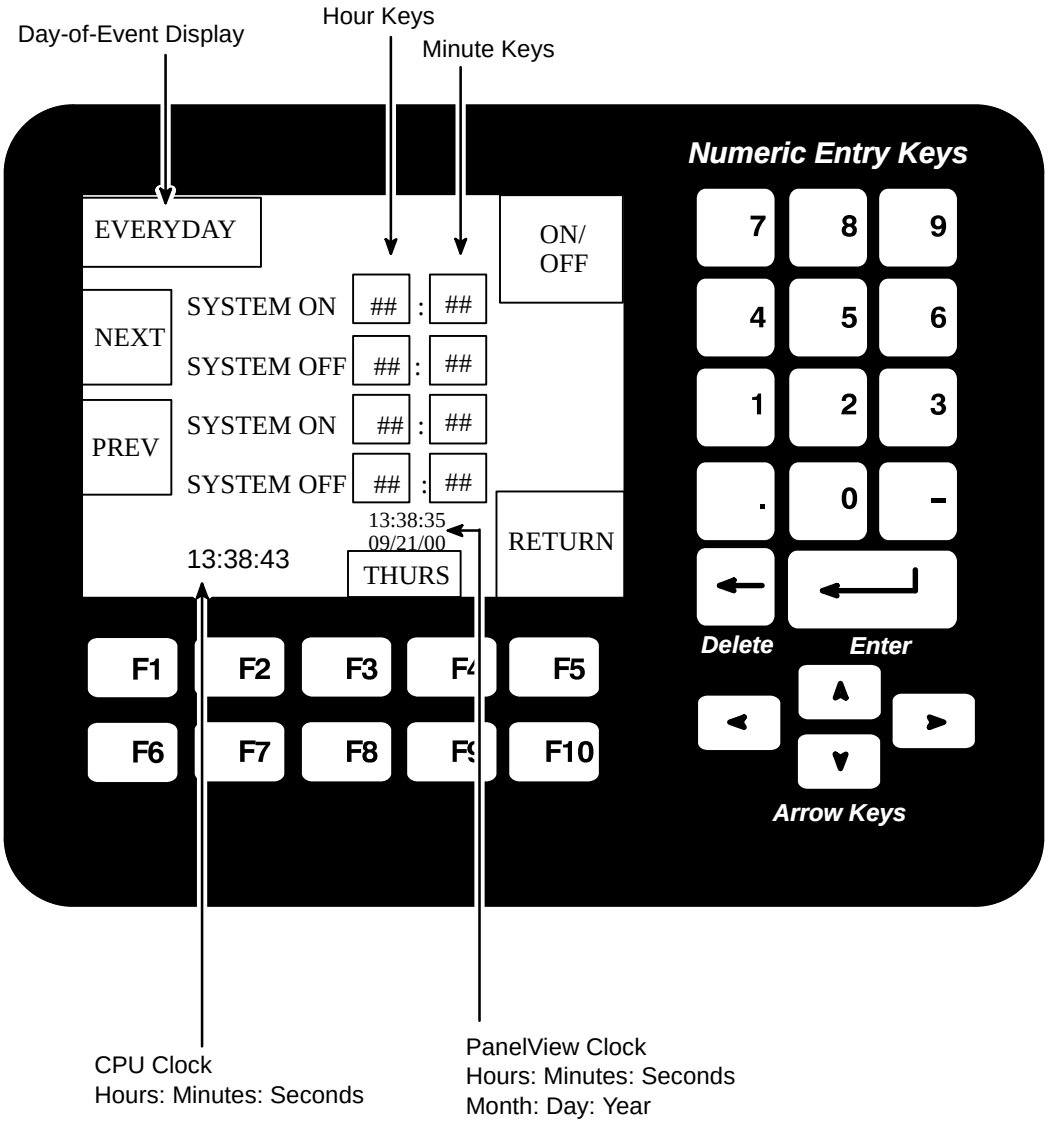
Notes: When Standby is active (i.e., ON and standing by), all the setpoints on the Temperature Zone Programming screens will display the reduced standby temperatures after the duration of the standby delay. When standby mode is deactivated, these temperatures will resume their pre-standby values.

Entering a standby time delay of "0" will result in the unit immediately going into standby when "standby mode" is activated.

3. Press Seven Day Scheduler to program the Scheduler. See the following pages for programming instructions.

Seven Day Scheduler Programming Screen

The Seven-Day Scheduler allows the operator to program automatic Turn On or Turn Off events which coincide with his daily production schedule throughout the work week. On or Off events may be programmed for any individual day of the week, or may be programmed for “Everyday” of the week at the same time.



Clock Synchronization

The 7-Day Scheduler screen displays two clocks which must be synchronized periodically in order for the scheduler to function properly. These clocks are the PanelView’s clock (which can be reset by following instructions on page 17) and the CPU’s clock (which must be synchronized to be reset).

The clocks are automatically re-synchronized whenever all of the scheduler’s eight days (Monday through Sunday plus Everyday) are turned OFF.

Even when the clocks are in sync, their times may read up to a couple of minutes difference

Use of the Seven Day Scheduler Programming Screen

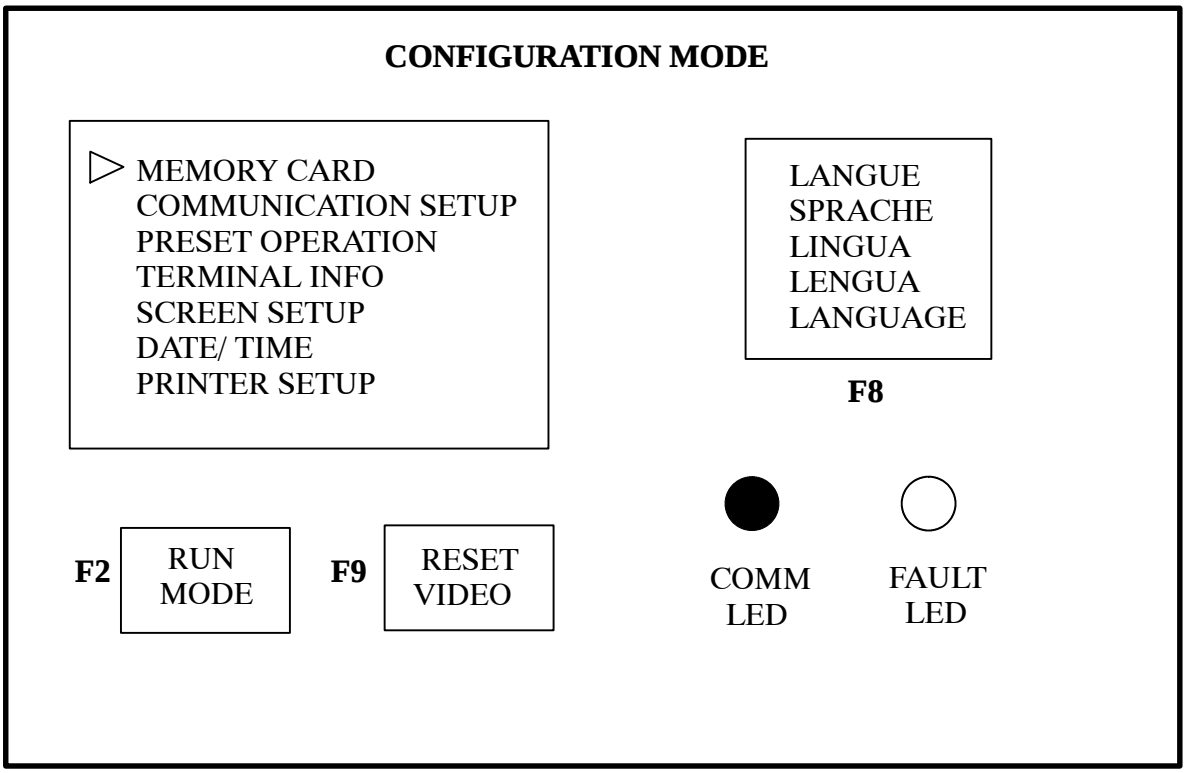
Press This Function Key	To:
Next	Select next day
Prev	Select previous day
System ON Hour ##	Program a desired turn ON hour
System ON Minute ##	Program a desired turn ON minute
System OFF Hour ##	Program a desired turn OFF hour
System OFF Minute ##	Program a desired turn OFF minute
System ON Hour ##	Program a second desired turn ON hour
System ON Minute ##	Program a second desired turn ON minute
System OFF Hour ##	Program a second desired turn OFF hour
System OFF Minute ##	Program a second desired turn OFF minute
ON/OFF	Toggle the Seven Day Scheduler ON or OFF for this day
Return	Return to the Main Menu

Programming

Up to four “events” may be scheduled for each day. An event is a programmed ON or OFF time.

1. Press Next or Prev to choose the first day you desire to schedule.
2. Hours and minutes are programmed in two steps as follows:
    a. Press the first Hour key, to program a desired ON hour:
        i. Use the numeric keypad to enter desired time of day (use 24 hour day/ military time).
        ii. Press the Enter arrow to store your desired time.
    b. Press the first Minute key, to program a desired ON minute:
        i. Use the numeric keypad to enter desired time of day (use 24 hour day/ military time).
        ii. Press the Enter arrow to store your desired time.
    c. Press On/ Off to make the Scheduler active or inactive for this day.
3. Repeat steps 1 and 2 until all days and times are programmed as desired.
4. Press Return to return to the Main Menu.

PanelView Configuration Screen



To Set Seven-Day Scheduler's Clock

1. Advance to the Configuration Mode screen (seen above) by pressing both the left and right arrow keys simultaneously.
2. On the menu, Scroll down to "DATE/ TIME". Press Enter.
3. Press F1 and enter the year.
   Press F2 and enter the month.
   Press F3 and enter the day.
   Press F6 and enter the hour.
   Press F7 and enter the minute.
   Press F8 and enter the second.
4. Press F10 to Exit.
5. Press F2 RUN MODE to return to the hot melt application.

Use of the PanelView Configuration Screen

Press This Function Key	To:
F2	Return to Run Mode (Main Menu)
F8	Select the displayed language
F9	Reset Video

The Configuration Mode screen allows the operator to adjust parameters that pertain to the PanelView controller only. These parameters *do not* pertain to the hot melt application. The Seven-Day Scheduler's clock is set via the Configuration screen.

Among the many adjustable parameters are: screen brightness and backlight, display language, date and time, printer parameters, communications and fault LED, etc.

Use the up and down arrows and the function keys (F1 thru F10) to move through the configuration screens.

To select items on the main Configuration Mode menu (the menu beginning with "Memory Card" and ending with "Printer Setup"), use the up and down arrows to select an item, then press Enter to bring up its parameter screen. Follow instructions on each screen to make adjustments or return to the configuration screen. For examples of each of the Configuration Mode Main Menu parameter screens, see the following page.

COMM LED and FAULT LED are read only status monitors.

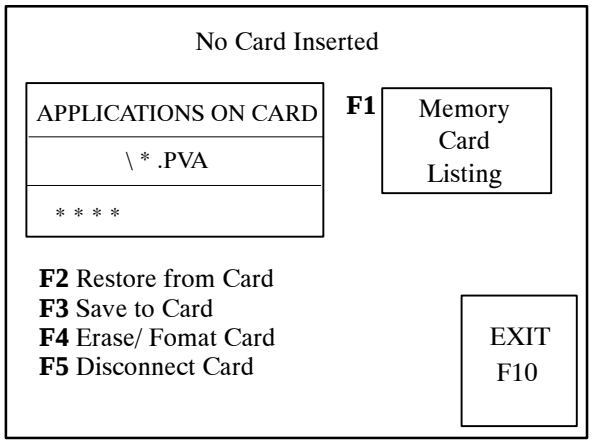
Press F9 to reset the video. No further adjustment is necessary.

Use F8 to choose a display language (for the Configuration screen only): French, German, Italian, Spanish or English.

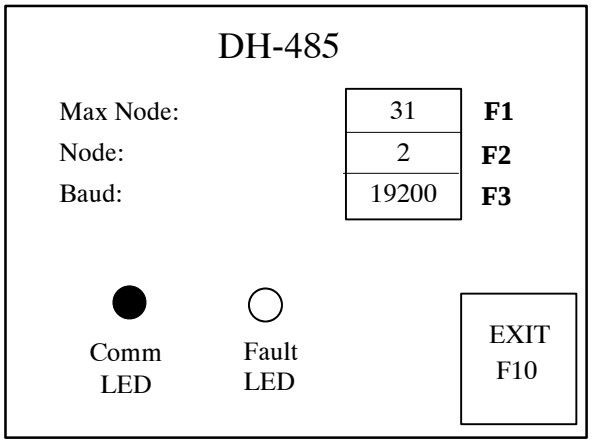
Press F2 to return to the Main Menu and the hot melt application.

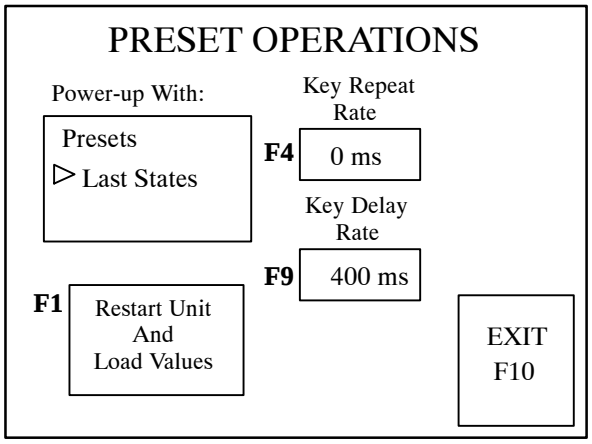
Configuration Mode
Main Menu Parameter Screens

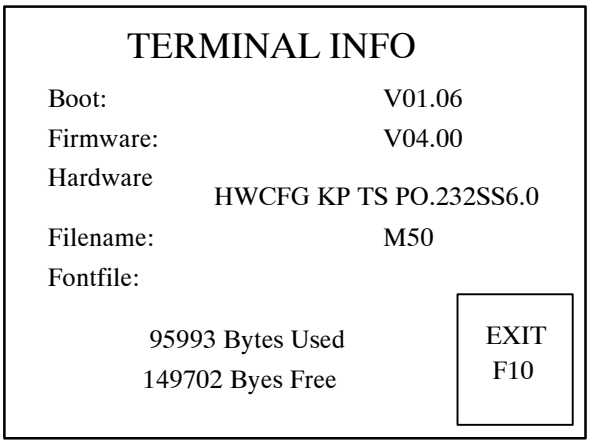
Memory Card Screen:

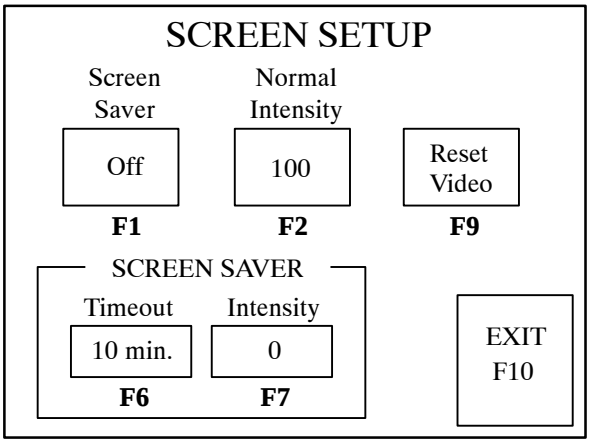


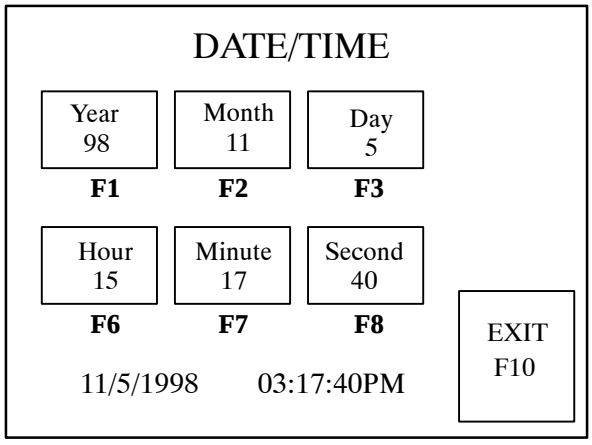
Communication Setup Screen:

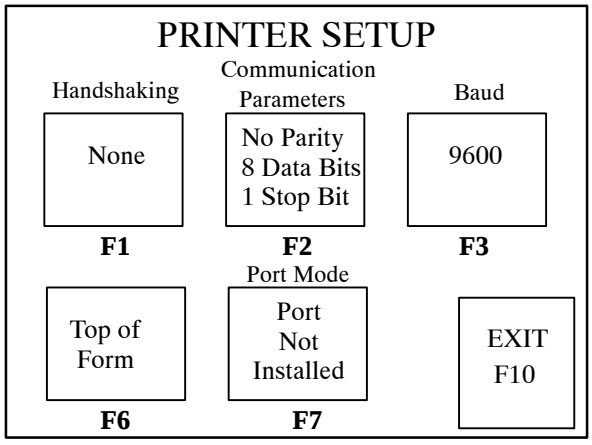












Helpful Tips for the User

- When the ASU is turned ON, the controller will detect any unused hose circuits which are turned ON (for example, a hose not plugged in), and will go into alarm. For this reason, all unused temperature zones must be programmed OFF.

- When the ASU is turned ON, all temperature setpoints and other operating parameters will be exactly where they were when the ASU was turned off.

- When the ASU is turned ON, all system heaters go ON unless they have previously been turned OFF.

Chapter 6
PREVENTIVE MAINTENANCE

Note: Re-read Chapter 1 "Safety Precautions" before performing any maintenance procedures. All maintenance procedures must be performed by qualified, trained technicians.

General Cleaning

The DYNAMELT® M SERIES ASU enclosure is finished with an extremely durable polyurethane paint. The enclosure may be cleaned with a variety of industrial cleaners following manufacturers' directions. To prevent discoloration or deterioration of the ASU's finish, avoid prolonged contact with strong solvents.

The molded plastic handles may be cleaned with mineral spirits.

Preventive Maintenence Schedule

The Dynamelt M ASU requires little maintenance. The hopper is fitted with a coarse screen to prevent large debris from entering the system. Normally this screen does not require cleaning. The ASU parts that require regular, periodic maintenance are as follows:

Replacing the Outlet Filter Basket

The outlet filter should be replaced monthly during the first few months of operation. After you gain experience with your system, you can determine how often you need to replace it. The outlet filter is located on the outlet filter manifold on the hose connection panel of the ASU. See illustration of theoutlet filter on page 6-2.

Use the following procedure to replace the standard outlet filter.

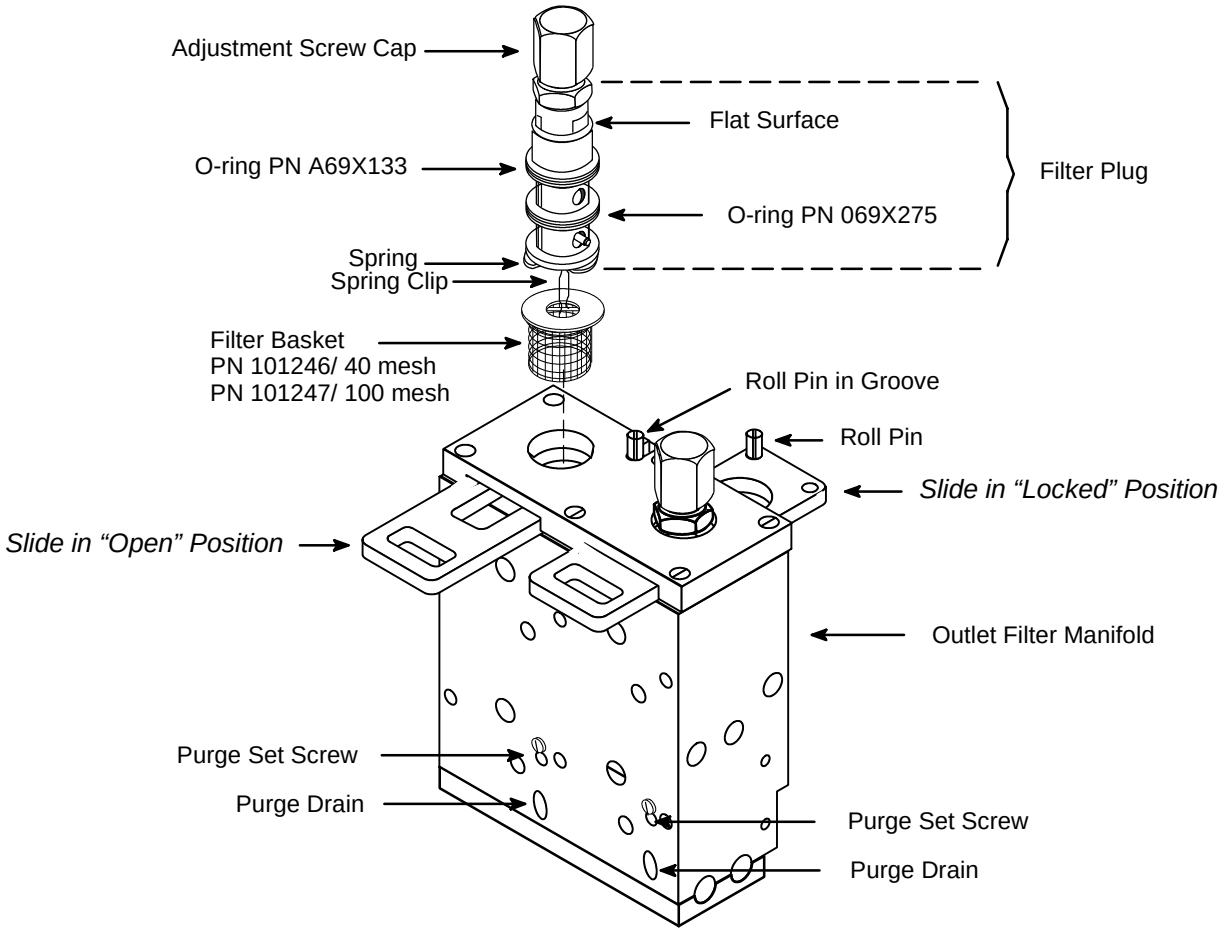
cont.

WARNING HIGH PRESSURE

Turn the motor OFF and trigger the applicators to relieve adhesive pressure before performing any outlet filter maintenance.

WARNING

Avoid splashing hot adhesive. The filter screen will be covered with hot adhesive and must be handled with proper tools. Position a heat-resistant container under the manifold before proceeding.



Standard Outlet Filter Manifold (located at the Hose Connection Panel)

1. The system should be at operating temperature before starting this procedure.

2. Before proceeding, verify that the motor(s) is turned OFF and the applicators have been triggered to relieve pressure.

3. Remove the Manifold Access Cover by unscrewing one screw. Then lift up and off.

4. Position a heat-resistant container below the manifold. With a hex key screwdriver (allen wrench), slowly loosen the manifold's two purge set screws (do not attempt to remove them). Allow adhesive and pressure to escape out of the manifold. Adhesive will drain into the container.

5. Wearing insulated gloves, push down on the adjustment screw cap with sufficient force to release the slide. While holding the cap down, pull the slide forward until the groove stops the roll pin.
   Note: If the cap moves "up" before the slide opens fully, this is an indication that there is

still pressure in the system. Stop and verify that the motor/ pump is turned OFF and the applicator's valves are open before proceeding. Then repeat step 5.

6. Pull the cap and the filter plug up and out of the filter cavity. Due to adhesive and the o-ring seals, there will be some resitance before the plug exits the cavity.
   Note: the filter basket hangs from the plug by a spring clip. If the filter pulls free of the spring clip and remains in the cavity, use a hooked tool to extract it.

7. Pull the filter basket free from the spring clip. The filter should be inspected and replaced as needed. Note the char and debris inside the filter basket.

8. Before replacing the filter basket, inspect the two o-rings on the filter plug. Replace any cut or damaged o-ring. Apply hi-temp lubricant (PN 001U002) to a new o-ring before installing.

CAUTION: The condition of the lower o-ring (PN 069X275) is especially critical to maintaining system pressure. A cut or scuffed (scratched) o-ring can allow system pressure to escape.

9. Replace or re-install the filter basket onto the spring clip. Push the filter onto the clip. The clip should straddle the wire bar located inside the hole at the top of the filter.

10. Lower the filter basket and the filter plug back into the filter cavity.

11. Position the two flat surfaces at the top of the filter plug parallel to the movement of the slide. The slide will not return to its operating (locked) position unless these flat surfaces are aligned properly. If necessary, twist the plug to align.

12. Re-tighten the two purge screws.

Replacing the Optional High Flow Outlet Filter Basket

1. The system should be at operating temperature before starting this procedure.

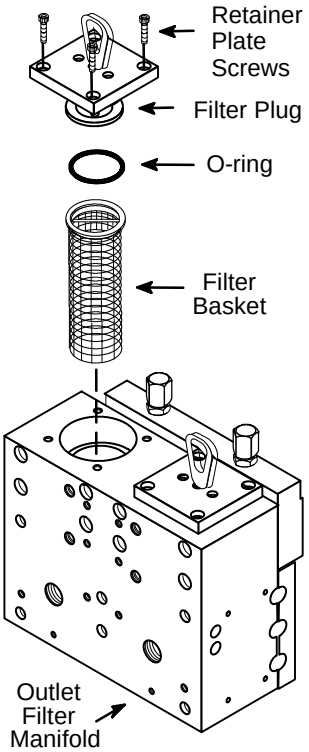
2. Before proceeding, verify that the motor(s) is turned OFF and the applicators have been triggered to relieve pressure.

3. Remove the Manifold Access Cover. Note: it is not necessary to remove the Lower Manifold Cover.

4. Using insulated gloves and an allen wrench, remove the retainer plate screws.

5. Lift out the retainer plate/ filter plug assembly.

6. Remove the clogged filter(s) and install a replacement filter.



High Flow Filter Manifold

cont.

Note: the filter(s) may be cleaned or replaced. If cleaning a filter, use only solvents recommended by your adhesive supplier.

7. Inspect the o-ring. Replace if flat or damaged.

8. Apply a coat of silicone lubricant onto the filter plug before re-inserting it into the manifold.

9. Apply a coat of anti-seize compound onto all screws before re-inserting.

10. Restore application system to normal operation.

Hose Fittings

All hose fittings should be checked for tightness after every three months of operation.

Fasteners

After the first ten hours of operation, check all set screws, socket head and cap screws for tightness. Thereafter, re-check all fasteners after every three months of operation.

Filter Shutoff Cleaning or Replacement

See the illustrations in Chapter 10 (Melt & Grid Assembly) for location of the filter shutoff(s). DM70, DM140 and DM210 models have two filter shutoffs.

1. Pump all the adhesive out of the hopper.

2. Lower the temperature of the application system to the adhesive's softening point.

WARNING HOT SURFACE

The ASU will still be hot for this procedure. Use insulated gloves and protective clothing when removing the filter shutoff.

3. Open the two access doors located at the sides of the ASU. Do not pull out the ground wires attached. The filter shutoff assemblies are located on either side of the hopper. Repeat this procedure for each assembly.

4. Wearing gloves, use a wrench to unscrew the filter shutoff nut and pull the filter shutoff out.

5. a. Replace the clogged filter shutoff assembly, or
   b. Emerse the assembly in flushing fluid (PN L15653) to loosen contaminants. Remove assembly from fluid and use a hot air gun (if necessary) and rags to clean all contaminants from it.

6. Apply a coat of anti-sieze compound onto the threads of the filter shutoff nut before re-inserting into the ASU.

7. Replace the filter shutoff o-ring. Lubricate the new o-ring with lube (PN N07588).

8. When re-installing the filter assembly, turn the filter's cut out hole toward the pump. Align the filter shutoff knob in its "open" position. Note: each filter shutoff is stamped "I" (open) and "0" (closed) to show position.

9. Close the access doors. Restore the ASU to normal operation.

Pump Shaft Leak

There is a cutout in the baseplate, directly below the pump shaft(s), which will allow adhesive from a leaking pump to exit the ASU. Inspect the area under the baseplate cutout every month for adhesive. A leaking pump shaft indicates a worn pump seal. See instructions in Chapter 8 for replacement of this seal.

Summary of Preventive Maintenance Schedule

Monthly (or as experience dictates)

1. Inspect outlet filter basket. Replace as required.

2. *Check for leaking adhesive under the baseplate, caused by a worn pump seal.* Replace as required.

Every Three Months (or as experience dictates)

1. Check all hose fittings for tightness.

2. Check all fasteners for tightness.

3. *Inspect filter shutoff.* Clean or replace as required.

Flushing the System

Contaminated adhesive, accumulation of residue in the system and hopper, or changing the adhesive formulation may require the system to be flushed. To flush the system, have at least 6 liters (1.5 gallons) of flushing fluid on hand (PN L15653) per hopper. Repeat this procedure for each hopper of a dual hopper ASU.

WARNING

The flushing fluid will splash easily. Wear protective clothing, gloves and a face shield to prevent severe burns.

1. Pump out as much of the molten adhesive from the hopper as possible.
2. Reduce the ASU's pump pressure to zero.

Note: the hose used in the following process is merely for the convenience of depositing flushing fluid. This procedure does not have to be repeated for each hose in the system.

3. Disconnect one of the supply hose's adhesive feed from its applicator head. Do not

cont.

disconnect the electrical power to the head (since that would disable the pump). Put the hose in a secured position within a container which will catch the used flushing fluid.

4. Add flushing fluid to the hopper and allow approximately fifteen minutes for it to reach hopper temperature. Carefully stir the flushing fluid to mix with any adhesive remaining in the hopper.

5. Slowly increase the pump pressure. Pump about half of the fluid through the hopper, pump and adhesive supply hose into the flushing container.

WARNING

Avoid splashing the flushing fluid from the end of the hose.

6. Reduce the pump speed to zero.

7. Remove the outlet filter and replace the basket following the procedures outlined in the ”Outlet Filter” section of this chapter.

8. Add new adhesive to the hopper and allow it to reach application temperature.

9. Slowly increase motor speed to the pump.

10. Actuate each of the heads until all the flushing fluid is removed and a steady stream of new adhesive flows.

11. Re-adjust the pump speed for the desired flow.

12. Re-fill the hopper with adhesive. The system is now ready for production.

Chapter 7
TROUBLESHOOTING

General Troubleshooting Notes

DANGER
HIGH VOLTAGE

WARNING
HOT SURFACE

Dynamelt systems use electrical power that can be life threatening and hot-melt adhesives that can cause serious burns. Re-read Chapter 1 "Safety Precautions" before performing any troubleshooting or repair procedures. All troubleshooting and repair procedures must be performed by qualified, trained technicians.

CAUTION: The SLC 500 modules are prone to damage from static electrical charges during handling. Read "Handling Printed CIrcuit Boards" on page 7-3 before handling or attempting service on the ASU's modules.

Preliminary Checks: Verify the following before proceeding:

1. The ASU is switched on.
2. The ASU is supplied with power.
3. The ASU is supplied with pneumatic air.
4. Pneumatic and electrical connections are correct.
5. Adhesive is in the hopper.

High & Low Alarm Zone Messages:

PanelView's Main Menu lists the identification numbers of zones with either high or low temperature alarms as they occur.

Low Alarms: At startup, all zones will show a low alarm until adhesive temperatures have reached their Ready setpoints. When Ready temperatures have been met, the alarms will automatically clear from the controller's display.

High Alarms: The controller will automatically turn OFF any temperature zone which registers a high alarm. High alarms indicate either: 1.) a zone which is over its high temperature limit, 2.) a short circuit, or 3.) an open circuit. To correct a high alarm, refer to the troubleshooting guide in this chapter. After correction, the operator must return to the Main Menu and toggle Heater Power ON. The controller will then clear the alarm and scan the system for other alarms.

Drive 1,2,...etc. Fault or DeviceNet Fault Messages:

PanelView's Main Menu System Status indicator may specify a faulted drive or a faulted DeviceNet. In most instances, these faults will automatically clear in (up to) 30 seconds. If they do not automatically clear, turn the ASUs power Off, then ON again at the circuit breaker. Observe the DeviceNet module, it may indicate a numbered fault. If so, refer to the AB DeviceNet manual to clear.

Hose/ Applicator Troubleshooting Tip

Hose or applicator problems can be isolated by electrically connecting the applicator and hose to an alternate socket on the ASU. If the malfunction goes with the applicator and hose, the problem will usually be in the applicator or hose that was moved. If the malfunction does not move with the applicator and hose, the problem is probably in the ASU.

High-Temperature Redundant Overtemp Thermostat

The Dynamelt M Series ASU includes a mechanical (redundant) overtemp thermostat that acts as a safety back-up. If the ASU's hopper temperature should exceed 232°C (450°F), the thermostat will cause the ASU's circuit breaker to open and power to the hopper and all hoses and heads will be cut off. The mechanical thermostat must be manually re-set after the hopper temperature falls below 204°C (400°F).

The overtemp thermostat is located behind the heater access door (see Chapter 8). To reset: turn OFF the ASU's main power switch, push the center of the thermostat's insulator, then restart the ASU.

Pump Enable Thermostat

The pump enable thermostat is a low-temperature safety feature of the Dynamelt ASU designed to prevent the pump from powering on before the adhesive is molten. It is a cartridge thermostat and it is factory set at 132°C (270°F). The thermostat is adjustable so that operators using adhesives with extraordinarily high or low melting points can tailor the low-temp setting to their production needs.

To access the pump enable thermostat, follow the instructions given in Chapter 8. To calibrate the thermostat, refer to instructions in Chapter 3.

SLC 500 Power Supply Fuse

An AGC-3 fuse, located inside the SLC's power supply, is intended to guard against fire hazard due to a short circuit. See illustration on page 7-4 for location. If all of the LEDs on the power supply and SLC 500 modules (inside the panel box) are unlit, this indicates an inoperative fuse.

DANGER HIGH VOLTAGE

Before attempting fuse replacement, all power must be removed from the SLC 500 power supply. Note: the exposed pin on the 3-pin jumper (located directly below the fuse) is electrically live. Contact with the pin may cause injury.

SLC Processor Battery

Inside the SLC processor module is a replaceable lithium battery. When the battery gets low, a red LED will illuminate on the module (for LED location see illustration on page 7-10).

To replace the battery:

Important Note: A capacitor provides at least 30 minutes of battery backup while the battery is disconnected. Data in RAM is not lost if battery is replaced within 30 minutes.

DANGER HIGH VOLTAGE

Do not remove the processor from the SLC 500 chassis until all power is removed from the SLC 500 power supply.

1. Remove all power from the SLC power supply.

2. Remove the processor from the chassis by pressing the retainer clips at both the top and bottom of the module before sliding it out.

CAUTION: Do not expose the processor to areas that may hold an electrostatic charge. See the following section "Handling the SLC 500's Components".

3. Unplug the battery connector from the socket and remove the battery.

4. Remove the battery from the retaining clips. Insert the new battery into the clips.

5. Plug the new battery's connector into the socket.

6. Re-insert the module into the SLC 500 chassis. Restore power to the power supply.

Handling the SLC 500's Components

The Dynamelt ASU and controller utilize several components and modules which are extremely sensitive to electrostatic charges. When working near or with these components, the following procedures must be followed to avoid damage to them.

DANGER HIGH VOLTAGE

Before unplugging connectors from a component, ground yourself to the ASU by touching any available unpainted cool metal surface, mounting screws, etc. This will avoid electrical discharge to the components when you are removing and replacing connectors.

CAUTION: The Allen Bradley modules should be handled using the following procedures:

1. **Wear a wrist grounding strap. If a grounding strap is not available, frequently touch a bare metal part of the ASU (unpainted frame, mounting screw, etc.) to safely discharge any electrostatic buildup on your body.**

2. **Handle the component by its edges only. Don't grip a component across its surface.**

3. **When removed from the ASU, each component must be individually packaged inside a metallized, static drain envelope. Do not place the removed component on a table, counter, etc. until it has first been placed in or on a static drain envelope.**

4. **When handing a component to another person, touch the hand or wrist of that person to eliminate any electrostatic charge *before* you hand the component to him.**

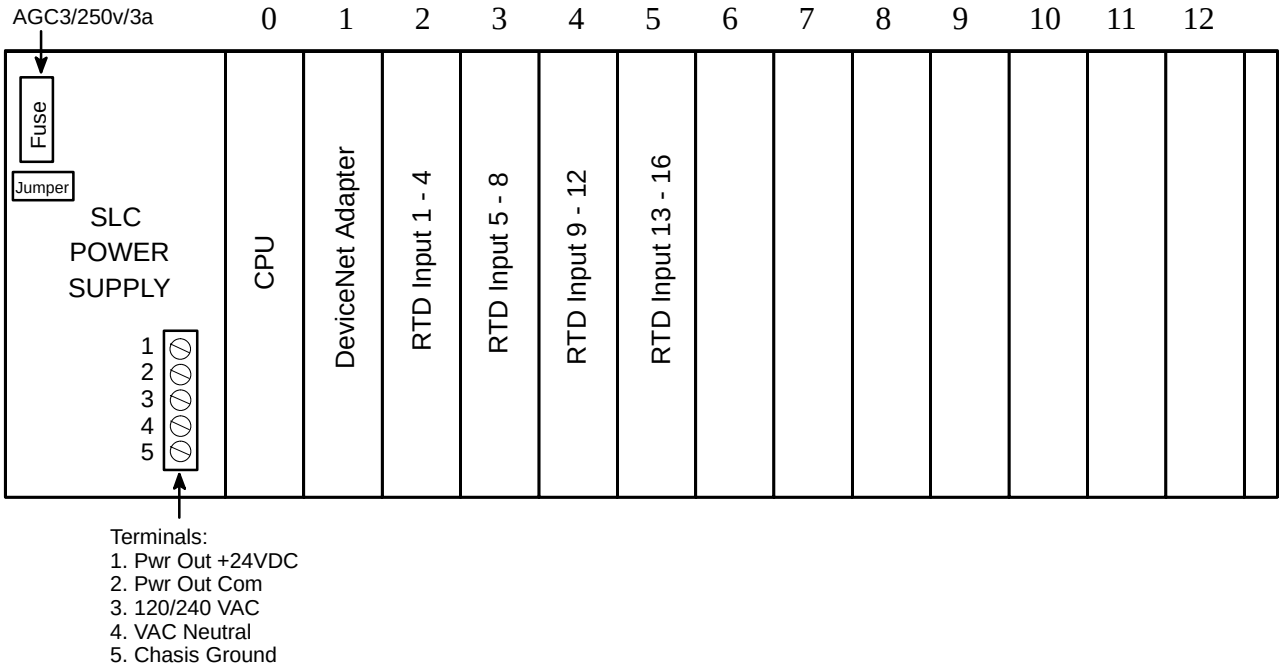
5. **When unwrapping a component from its static drain envelope, place the envelope on a *grounded, nonmetallic* surface.**

6. **To cushion components for shipment, use only static-drain bags or packaging. Do not use foam peanuts or bubble pack not known to be static draining.**

The following pages detail the SLC 500 modules.

Model DM M35: AllenBradley SLC Module Configuration

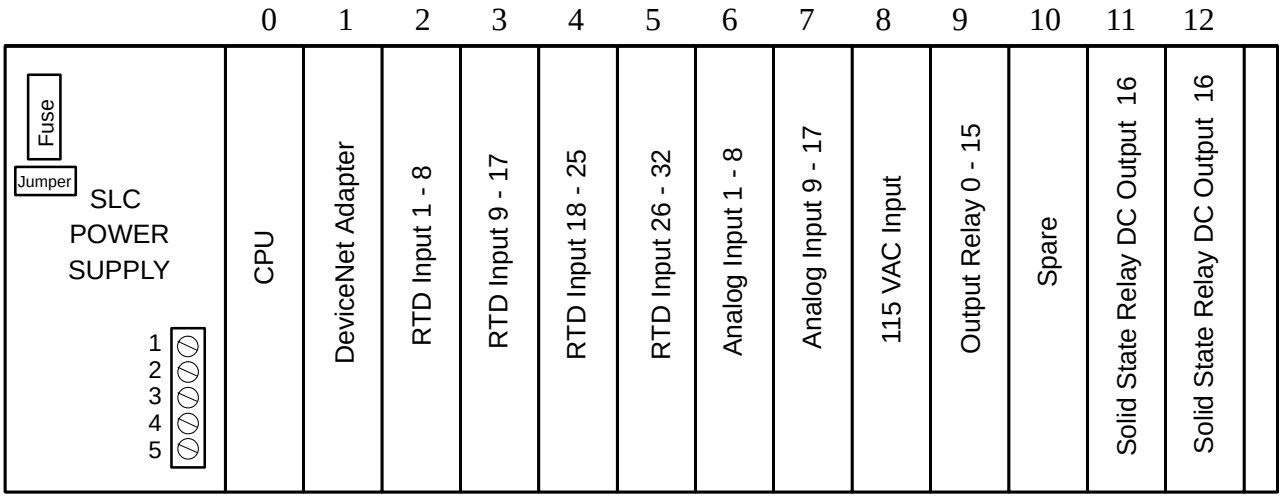
Illustrated below is the maximum module configuration for a fully loaded Model 35 ASU.



Layout of Components DM M35 SLC Modules

Model DM M70/140: AllenBradley SLC Module Configuration

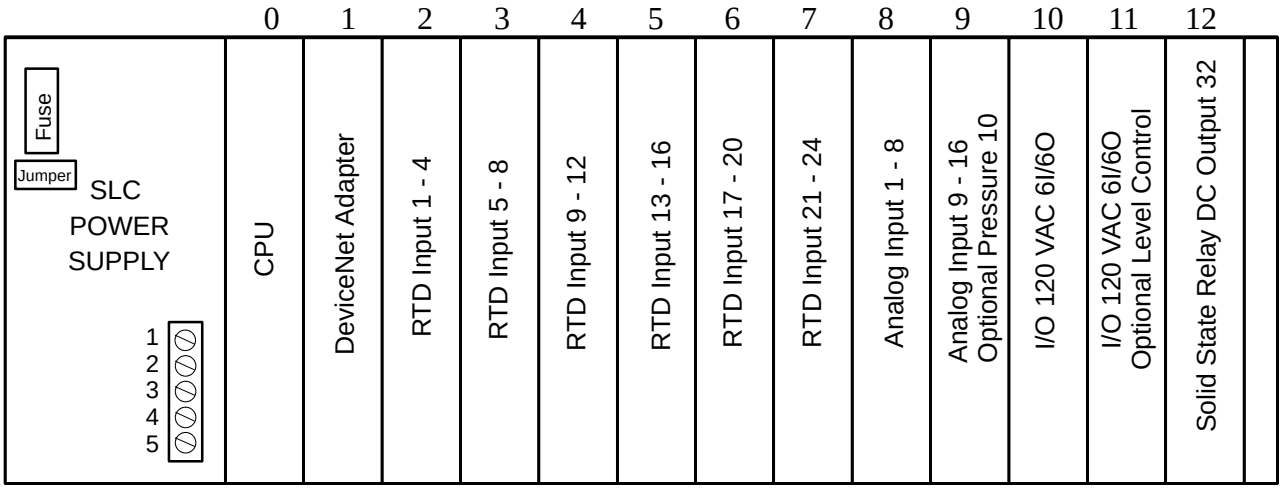
Illustrated below is the maximum module configuration for a fully loaded Model 70 or 140 ASU. For SLC Power Supply's fuse size and terminal definitions, see page 7-4.

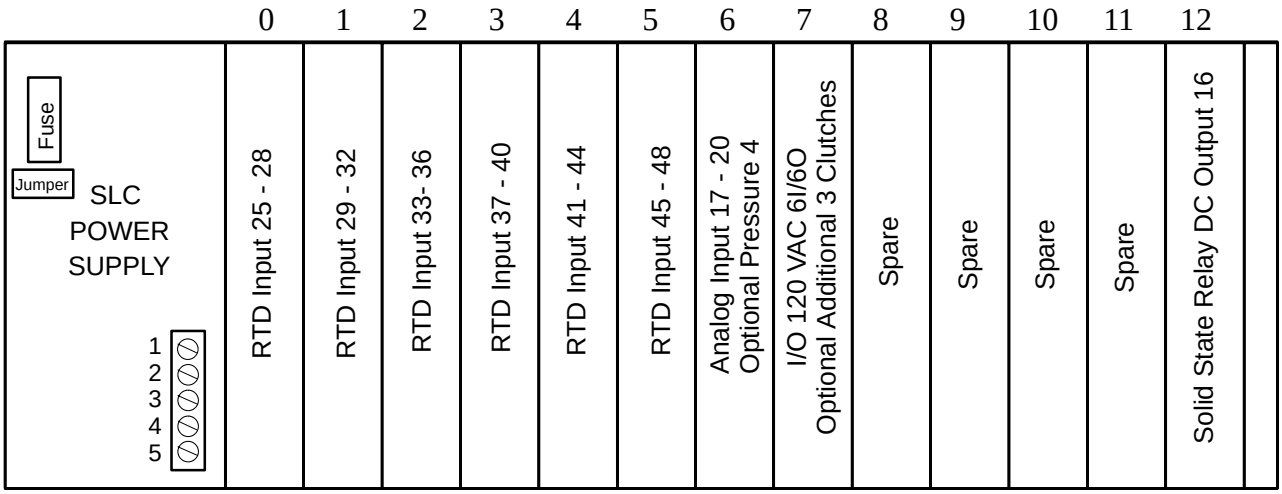


Layout of Components DM M70/140 SLC Modules

Model DM M210: AllenBradley SLC Module Configuration

Illustrated below is the maximum module configuration for a fully loaded Model 210 ASU. For SLC Power Supply's fuse size and terminal definitions, see page 7-4.



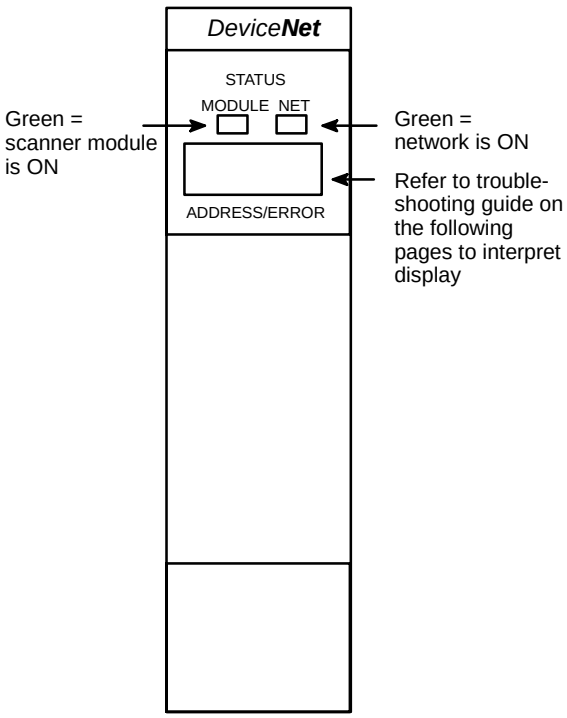


Layout of Components DM M210 SLC Modules

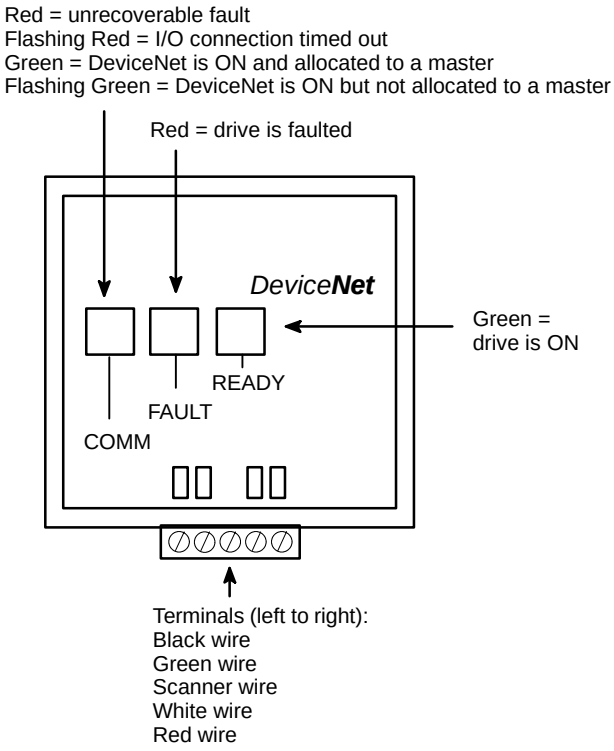
DeviceNet Communications Module

The SLC 500 system utilizes DeviceNet to communicate with the ASU's drives. DeviceNet operates via two modules: the scanner module which is a card on the SLC 500 rack, and the DeviceNet module(s) which is mounted on the drives.

The illustrations below provide a brief description of the LEDs and connections. For more detail, refer to the Allen Bradley DeviceNet manual.



Scanner Module Layout



DeviceNet Module Layout

DeviceNet, cont.

Troubleshooting with the Scanner's Error Code Display

The Scanner Module displays an "Address/ Error" code that is interpreted as follows:

Code #	Problem	Correction
0-63	Normal operation. The numeric display matches the scanner's node address on the DeviceNet network.	Do nothing.
70	Scanner failed Duplicate Node Address check.	Change the scanner channel address to another available one. The node address you selected is already in use on that channel.
71	Illegal data in scan list table (node number alternately flashes).	Reconfigure the scan list table and remove any illegal data.
72	Slave device stopped copmmunicating (node number alternately flashes).	Inspect the field devices and verify connections.
73	Device ID does not match scan list table entry (node number alternately flashes).	Enter a matching scan list device ID.
74	Data overrun on port detected.	Modify your configuration and check for invalid data.
75	No network traffic at all has been detected.	Verify connections.
76	No direct network traffic for scanner detected.	None. The scanner hears other network communication.
77	Data size returned does not match scan lists entry (node number alternately flashes).	Reconfigure your module and change the addressing.
78	Slave device in scan list table does not exist (node number alternately flashes).	Add the device to the network, or delete the scan list entry for that device.
79	Scanner has failed to transmit a message.	Make sure that your module is connected to a valid network. Check for disconnected cables.
80	Scanner is in IDLE mode.	None.

cont.

Troubleshooting with the Scanner's Error Code Display, *cont.*

Code #	*Problem*	*Correction*
81	Scanner is in FAULT mode.	None.
82	Error detected in sequence of fragmented I/O messages from device (node number alternately flashes).	Check scan list table entry for slave device to make sure that input and output data lengths are correct. Check slave device configuration.
83	Slave device is returning error responses when scanner attempts fo communicate with it (node number alternately flashes).	Check accuracy of scan list table entry. Check slave device configuration.
84	Scanner is initializing the DeviceNet channel.	None. This code clears itself once scanner attempts to initialize all slave devices on the channel.
85	Data size returned is bigger than expected.	Check accuracy of scan list table entry. Check slave device configuration.
88	*This is not an error.* At powerup and reset, the module dislays all 14 segments of the node address and status display LEDs.	None.
90	User has disabled communication port.	Reconfigure your module.
91	Bus-off condition detected on comm port. Scanner is detecting communication errors.	Check DeviceNet connections and physical media integrity. Check system for failed slave devices or other possible sources of network interference.
92	No network power detected on comm port.	Provide network power. Make sure that scanner drop cable is providing network power to scanner comm port.
95	Application FLASH update in progress.	None. Do not disconnect the module while application FLASH is in progress. You will lose any existing data in the scanner's memory.
97	Scanner halted by user command.	None.
98	Unrecoverable firmware failure.	Service or replace your module.
99	Unrecoverable firmware failure.	Service or replace your module.

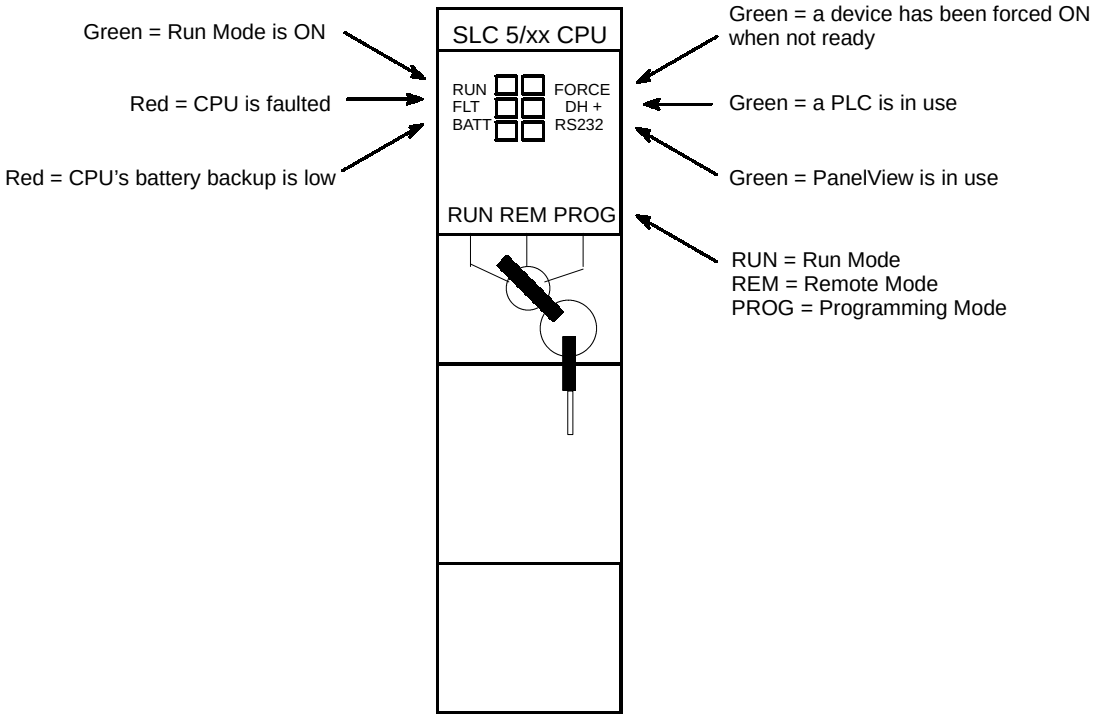
SLC Processor (CPU) Module

The SLC 500 Processor operates as the system's CPU.

A keyswitch selects one of the module's three modes: Run Mode, Remote Mode or Programming Mode. To operate the adhesive application system through the PanelView controller, select Run Mode. To connect to a programming device (laptop, remote PLC, etc.) select Remote Mode. Select Programming Mode to lockout (disable) all ASU and programming functions.

Force (see illustration) is used during Setup or Toubleshooting. It is a warning that a device has been turned on when the ASU is not ready.

The illustration below provides a brief description of the LEDs on this module. For more detail, refer to the Allen Bradley manual.



SLC Processor (CPU) Module Layout

Input Modules

The SLC 500 utilizes RTD, Analog and 115 VAC Input modules.

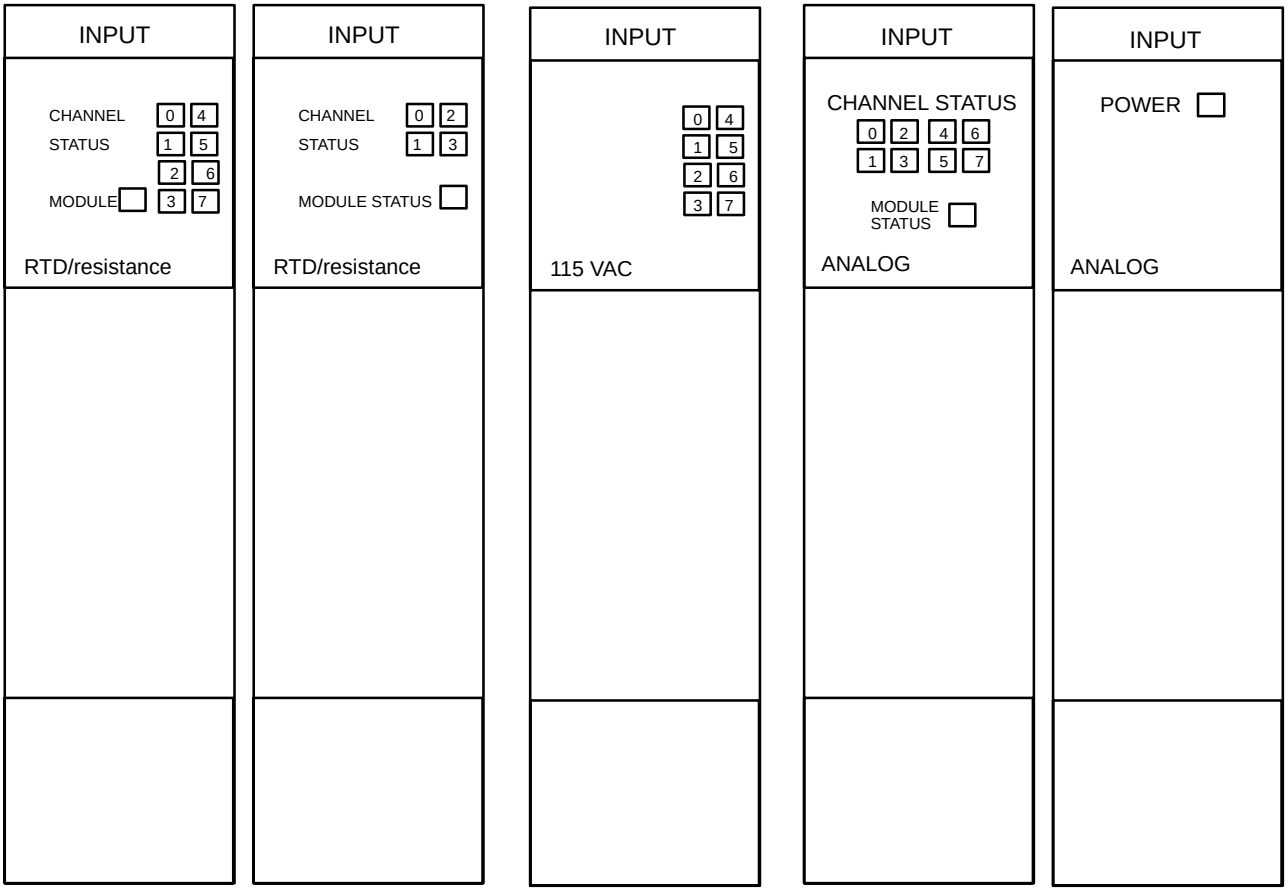
Pressure transducers and/ or line speed inputs are wired into the Analog Input module(s).

The system's RTDs are wired into the RTD Input module(s). Each temperature zone in the ASU system utilizes an RTD to measure temperature. Each RTD is wired into a terminal of a RTD Input module. One RTD Input module can accomodate up to four RTDs (channels).

The 115 VAC Input modules accomodates items such as the overtemp and pump enable thermostats and temperature zones.

A green light on the module means that it is ON (inputting).

The illustrations below provide a brief description of the LEDs on these modules. For more detail, refer to the Allen Bradley manual.



8-Input Module 4-Input Module

RTD Input Module Layouts

115 VAC Input Module Layout

Analog Input Module Layouts

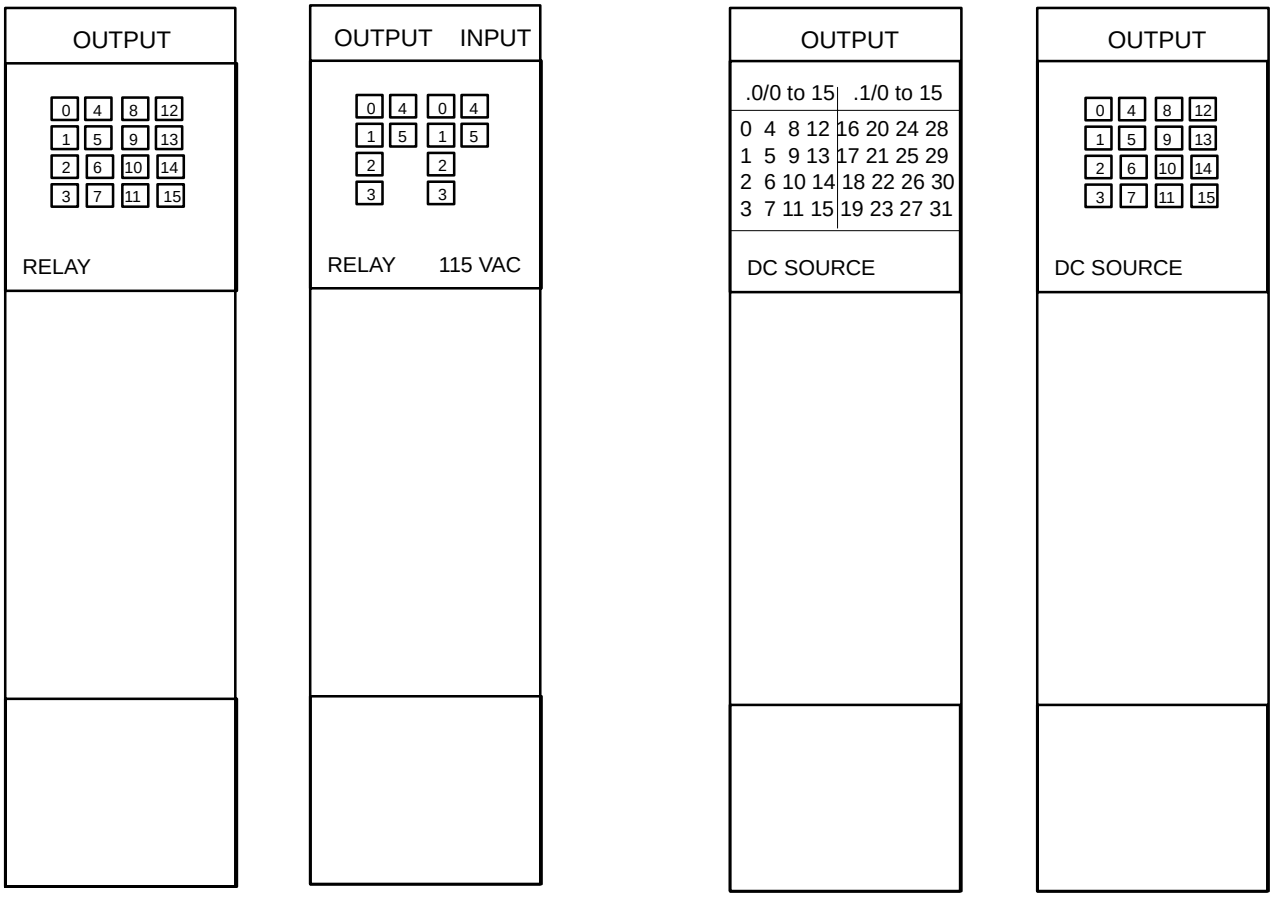
Output Modules

On the Output modules, each temperature zone has a red LED. The LEDs illuminate when the zone's heater comes on (ie, is outputting).

On the Relay Output module (shown below to the left), the top eight outputs are used by ITW Dynatec for 115 VAC. The bottom eight outputs may be used by the customer for either AC or DC.

The DC Source Output modules are used for the ASUs solid state relays.

The illustrations below provide a brief description of the LEDs on these modules. For more detail, refer to the Allen Bradley manual.



Output Module Layouts

Heater and Sensor Resistance Values

The resistance values given in the four tables on the following page will aid in troubleshooting when a sensor or heater malfunction is suspected. The “Temperature Sensor Resistance” table gives values for various temperatures. If you know the approximate temperature of the suspected sensor, you can check to see if the sensor resistance approximates the value given in the table by unplugging the affected head or hose connection and measuring resistance across the affected pins (see wiring diagram in Chapter 11 for pin numbers).

DANGER HIGH VOLTAGE

Disconnect input power to the application system before disconnecting/ re-connecting electrical connections. Make sure there is no electrical power on the leads you will be connecting.

The “Nominal Hose Heater Resistance” table gives the heater resistance for hoses. A suspected hose heater problem can be quickly isolated by measuring hose heater resistance and comparing it to the correct resistance for your hose length and voltage as shown.

The “Nominal Head Heater Resistance” table gives values for several different head wattages. A suspected head heater problem can be isolated by measuring head heater resistance and comparing it to the resistance for the appropriate wattage of your system.

The “Nominal Hopper Heater Resistance” table gives heater resistance for the hopper heaters of each Dynamelt M Series model and for the (optional) drop-in grids.

The “Nominal Filter Manifold Heater Resistance” table gives heater resistance for the heater located in the (optional) filter manifold/ pressure relief block. The heater inside the manifold varies depending on the number of filter manifolds mounted on the ASU, therefore resistance varies also.

Temperature °F	Temperature °C	Resistance in Ohms
32	0	100
50	10	104
68	20	108
86	30	112
104	40	116
122	50	119
140	60	123
158	70	127
176	80	131
194	90	135
212	100	139
230	110	142
248	120	146
268	130	150
284	140	154
302	150	157
320	160	161
338	170	164
356	180	168
374	190	172
392	200	176
410	210	180
428	220	183

Temperature Sensor Resistance
(0.00385 PT 100 RTD)

Hose Length Meters	Hose Length Feet	Resistance in Ohms
1.2	4	323-358
1.8	6	201-223
2.4	8	155-172
3	10	120-133
3.7	12	102-114
4.9	16	75-84
7.3	24	51-57

Nominal Hose Heater Resistance
for DynaFlex Hoses

Watts	Resistance in Ohms
200	288
270	213
350	165
500	115
700	82

Nominal Head Heater Resistance

Note: Resistance is measured at ambient temperature (20°C/ 68°F).

Model :	M35	M70/ 140	M210
Qty. Hopper Heaters	1	2	3
Max. # of Drop-in Grids	2	4	6
Resistance (Ohms) for each Hopper Heater	11.5	11.5	11.5
Resistance (Ohms) for each Drop-in Grid Heater	23	23	23

Nominal Hopper Heater Resistance in Ohms

# of Filter Manifolds on ASU	Model: M35	M70/140	M210
1	115.2	115.2	115.2
2	51.6	51.6	51.6
3	not available	38.4	38.4
4	not available	28.8	28.8
5	not available	not available	TBD
6	not available	not available	186

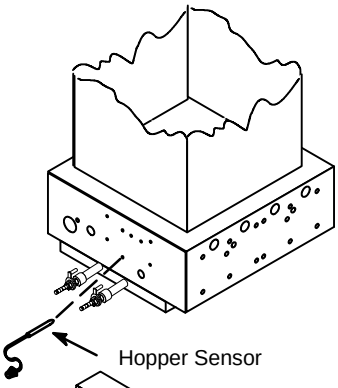
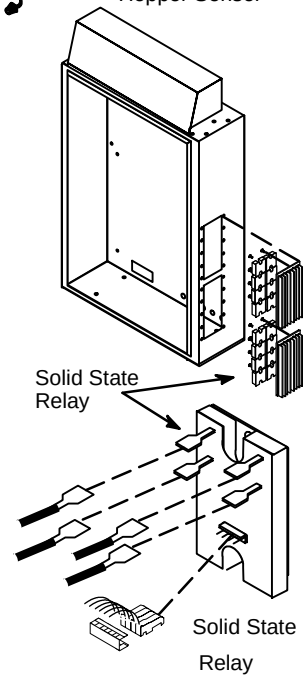
Nominal Filter Manifold Heater (optional) Resistance in Ohms

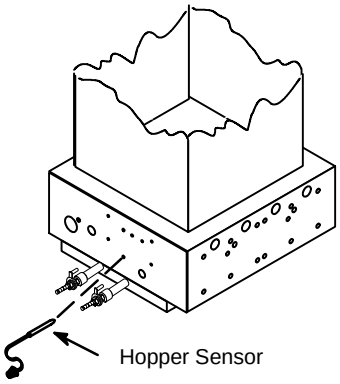
Error Indication Alarm Troubleshooting Guide

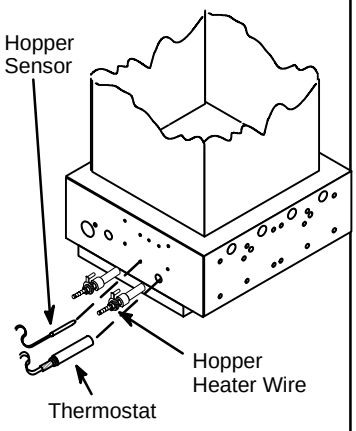
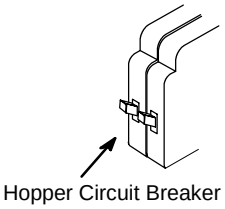
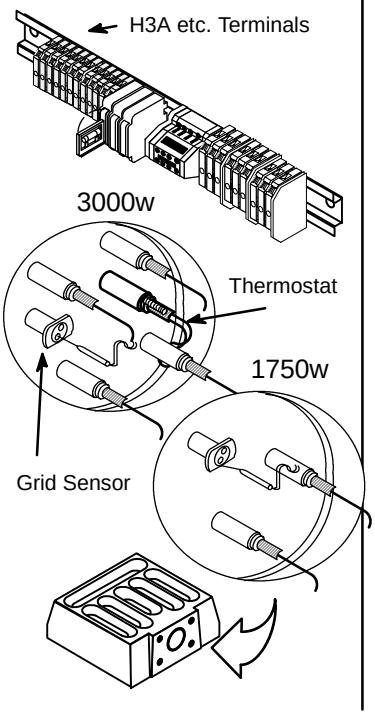
The operation of error indication alarms is described in Chapter 4. When checking for correct equipment operation in the following guide, be aware that all heaters will go off immediately after an error indication alarm occurs if the operator takes no action. With the exception of the fuses, there are no user-replaceable parts on the printed circuit boards. If there is a non-fuse failure on a PCB, the PCB must be replaced.

DANGER HIGH VOLTAGE

Some of the procedures in the following Troubleshooting Guide require potentially dangerous electricity to be present. Only qualified service personnel should perform these procedures.

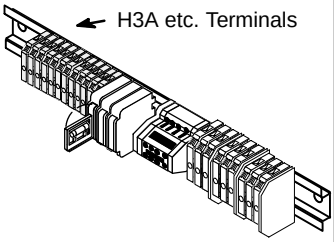
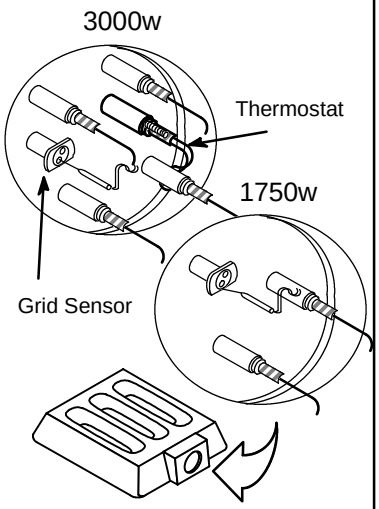
Problem	Possible Cause	Solution
Hopper (tank) Overtemp  	1. Setpoints have been programmed without enough deviation. 2. Disconnection between an RTD module and the rack. 3. Hopper sensor inoperative. 4. Hopper control solid state relay inoperative.	1. Re-program setpoints, allowing a larger deviation between the high and low limits. 2. Verify that all modules are properly inserted in their sockets on the module rack. 3. Replace hopper sensor if resistance does not comply with the resistance table in this chapter. 4. a. Verify that the relay is not shorted by removing all of its output wires and verifying that resistance is greater than zero. b. Verify condition of relay by disconnecting, then re-connecting properly. Then, when Temperature Zone is OFF, use a VOM AC voltmeter to verify that 240 volts are not present at the heater terminal.

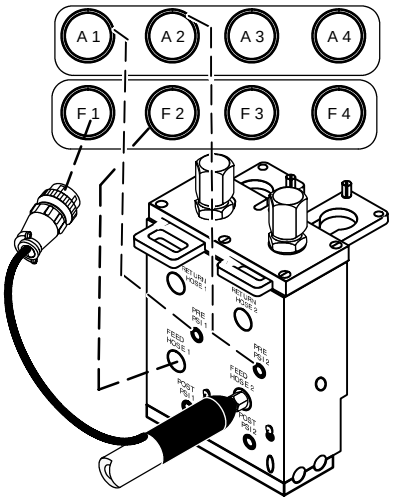
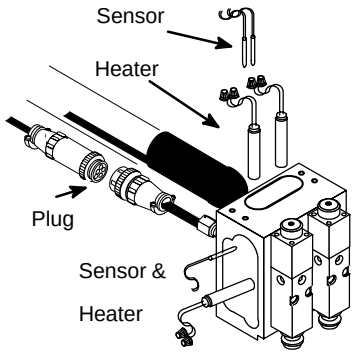
Problem	Possible Cause	Solution
Hopper Sensor Open  	1. Sensor cable has become unplugged from RTD module. 2. Disconnection between RTD module and the rack. 3. Inoperative hopper sensor.	1. Verify that hopper sensor cable is properly connected on the RTD module. 2. Verify that all RTD modules are properly inserted in their sockets on the module rack. 3. Replace hopper sensor if resistance does not comply with resistance table in this chapter.
Hopper Sensor Short	1. Pinched sensor lead wire. 2. Inoperative hopper sensor.	1. Visually inspect sensor lead wire for break, kink, damage, etc. If no obvious damage, use an ohmmeter to measure continuity from the sensor lead to the plug at the RTD module. Repair or replace any damaged wire. 2. Replace hopper sensor if resistance does not comply with resistance table in this chapter.

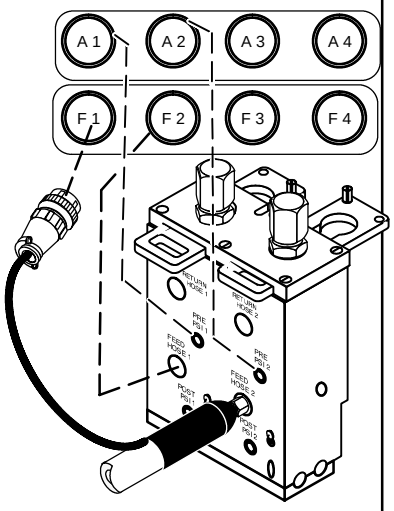
Problem	Possible Cause	Solution
Hopper Heater Open 	1.Disconnection in hopper heater circuit.	1. Inspect hopper heater wiring for proper connections.
	2. Hopper circuit breaker tripped.	2. Refer to the schematic in Chapter 11 to locate the hopper circuit breaker. If it is tripped, do not re-set it without checking for causes. Visually and electrically inspect for a short-circuit to ground in the hopper heater circuit. This will be limited to between the hopper control relay and the hopper heater.
	3. Open hopper heater element.	3. At the terminal rail, use an ohmmeter to measure resistance as follows: Model M35: across H3A and H3B, Models 70/140: across H5A and H5B, Model 210: across H7A and H7B. See the resistance table in this chapter for normal resistance values. Infinitely high reisistance values indicate an open heating element which must be replaced.
		
(Optional) Drop-in Grid Overtemp 	1. Setpoints have been programmed without enough deviation.	1. Re-program setpoints, allowing a larger deviation between the high and low limits.
	2. Disconnection between the RTD module and the rack.	2. Verify that all modules are properly inserted in their sockets on the module rack.
	3. Grid sensor inoperative.	3. Examine grid sensor assembly for intermittent break in sensor lead. Remove sensor bulb from grid. Replace grid sensor if resistance does not comply with the resistance table in this chapter.
	4. Grid control solid state relay inoperative.	4. a. Verify that the relay is not shorted by removing all of its output wires and verifying that resistance is greater than zero. b. Verify condition of relay by disconnecting, then re-connecting properly.

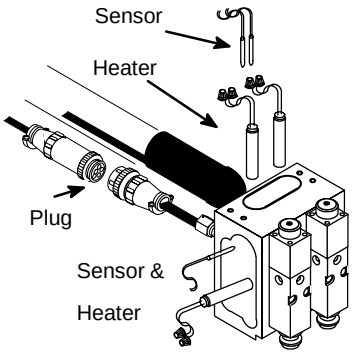
cont.

Problem	Possible Cause	Solution
		Then, when Temperature Zone is OFF, use a VOM AC voltmeter to verify that 240 volts are not present at the heater terminal.
(Optional) Drop-In Grid Sensor Open	1. Sensor cable has become unplugged from RTD module.	1. Verify that grid sensor cable is properly connected to its RTD module.
	2. Disconnection between RTD module and the rack.	2. Verify that all modules are properly inserted in their sockets on the module rack
	3. Drop-in grid sensor inoperative.	3. Replace sensor if resistance does not comply with the resistance table in this chapter
(Optional) Drop-in Grid Sensor Short	1. Pinched sensor lead wire.	1. Visually inspect sensor lead wire for break, kink, damage, etc. If no obvious damage, use an ohmmeter to measure continuity from the sensor lead to the plug at the RTD module. Repair or replace any damaged wire.
	2. Drop-in grid sensor inoperative.	2. Replace sensor if resistance does not comply with the resistance table in this chapter
	3. RTD module is inoperative.	3. Replace RTD module.

Problem	Possible Cause	Solution
(Optional) Drop-in Grid Heater Open  	1. Disconnection in grid's heater circuit. 2. Drop-in grid circuit breaker tripped. 3. Open drop-in grid heater element. 4. RTD module is inoperative.	1. Inspect grid's heater wiring for proper connections. 2. Refer to the schematic in Chapter 11 to locate the grid's circuit breaker. If it is tripped, do not re-set it without checking for causes. Visually and electrically inspect for a short-circuit to ground in the grid's heater circuit. This will be limited to between the grid's control relay and the grid's heater. 3. At the terminal rail, use an ohmmeter to measure resistance as follows: For 1 grid: H1A & N (380v) H1A & H1B (240v) For 2nd grid: H2A & N (380v) H2A & H2B (240v) For 3rd grid: H3A & N (380v) H3A & H3B (240v) For 4th grid: H4A & N (380v) H4A & H4B (240v) For 5th grid: H5A & N (380v) H5A & H5B (240v) For 6th grid: H6A & N (380v) H6A & H6B (240v) See the resistance table in this chapter for normal resistance values. Infinitely high reisistance values indicate an open heating element which must be replaced. 4. Replace RTD module.

Problem	Possible Cause	Solution
Hose/ Head (No.) Overtemp  *Note: DMM 70/ 140/ 210 arrangement shown above. For DMM 35, see Chapter 3.*	1. Hose/ Head setpoints incorrectly programmed. 2. Inoperative head/ hose dual solid state relay. 3. Disconnection between RTD module and the rack. 4. Hose/ Head sensor circuit inoperative.	1. Re-program setpoints to allow a larger deviation. 2. Refer to the schematic in Chapter 11 to locate the correct head/ hose relay. Use a clamp-on ammeter to monitor head/ hose current. If current does not cycle on and off, then the relay has failed and must be replaced. 3. Verify that all modules are properly inserted in their sockets on the module rack. 4. a. Visually examine socket connection where hose/ head attaches to ASU. Verify that pins are properly seated. If pins or plug housing are damaged, repair or replace hose. If socket is damaged, repair or replace harness. b. If hose-to-ASU plug and socket are okay, hose may have intermittent short or open circuit. Repair or replace hose, hose harness or DC output module as appropriate. Alternately, problem can be isolated by connecting the effected hose to a different ASU hose socket to tell whether the problem is in the hose or in the DC output module. c. If head-to-hose and hose-to-ASU plugs and sockets are okay, head sensor may have an intermittent short or open circuit. Examine connections inside the service block area of the head and monitor head sensor resistance with an ohmmeter while flexing sensor leads. Repair or replace as appropriate.
 		
Hose/ Head (No.) Sensor Open	1. Disconnection between hose and ASU.	1. Visually examine connection where hose plugs into ASU socket for proper contact and seating. If pins or housings are damaged, repair or replace hose or hose harness (in ASU).

Problem	Possible Cause	Solution
 *Note: DMM 70/ 140/ 210 arrangement shown above. For DMM 35, see Chapter 3.*	2. Hose sensor harness unplugged from RTD module. 3. Disconnection between RTD module and the rack. 4. Hose/ Head sensor circuit inoperative.	2. Verify that effected hose is properly connected to heater on the RTD module. Replace or repair damaged hose harness as necessary. 3. Verify that all modules are properly inserted in their sockets on the module rack. 4. Replace head sensor if resistance does not comply with resistance table in this chapter. Use hose schematic to check hose sensor at ASU socket. Repair or replace hose, hose harness or RTD module as appropriate.
Hose/ Head (No.) Sensor Short	1. Debris at connection between hose/ head and ASU. 2. Hose/ Head sensor circuit inoperative.	1. Visually inspect hose plug and ASU socket for cleanliness and proper contact and seating of pins. 2. a. Using the hose schematic, check hose sensor resistance at ASU socket. An ohmmeter can be used to isolate a pinched wire in the hose harness. When cause is isolated, replace hose, hose harness or RTD module as appropriate. b. If head-to-hose and hose-to-ASU plugs and sockets are okay, head sensor may have an intermittent short or open circuit. Examine connections inside the service block area of the head and monitor head sensor resistance with an ohmmeter while flexing sensor leads. Repair or replace as appropriate.

Problem	Possible Cause	Solution
Hose/ Head (No.) Heater Open  	1. Disconnection between hose/ head and ASU.	1. Visually examine effected hose plug and ASU socket for cleanliness and proper contact and seating. Refer to the wiring diagram for pin identification. The problem can be isolated by plugging the effected hose/ head into another ASU socket. If the new hose number is then displayed as malfunctioning, the problem is in the hose that was moved. Repair or replace hose, head or ASU hose harness as appropriate.
	2. Disconnection between cartridge heater and cable assembly inside head.	2. Visually inspect wiring inside head. Verify that cartridge heater leads are properly connected in the service block area.
	3. Inoperative hose/ head circuit breaker.	3. Refer to schematic in Chapter 11 for location of circuit breaker. If it is found to be tripped, do not re-set it without first finding cause. Visually inspect and use an ohmmeter to check for a possible short circut to ground in the hose/ head heater circuit.
	4. Open hose/ head heater element.	4. Use an ohmmeter to measure hose/ head heater resistance. See resistance table in this chapter for resistance values. Infinitely high resistance indicates an open heater element.
	5. Open wiring inside ASU.	5. Visually inspect ASU wiring and use an ohmmeter and the wiring diagram to locate open wires in head heater circuit. Repair or replace ASU hose head harness or other ASU wiring as necessary.

Adjustable Adhesive Pressure Relief Valve

Dynamelt pumps are outfitted with a high-pressure relief valve located on the outlet filter manifold.

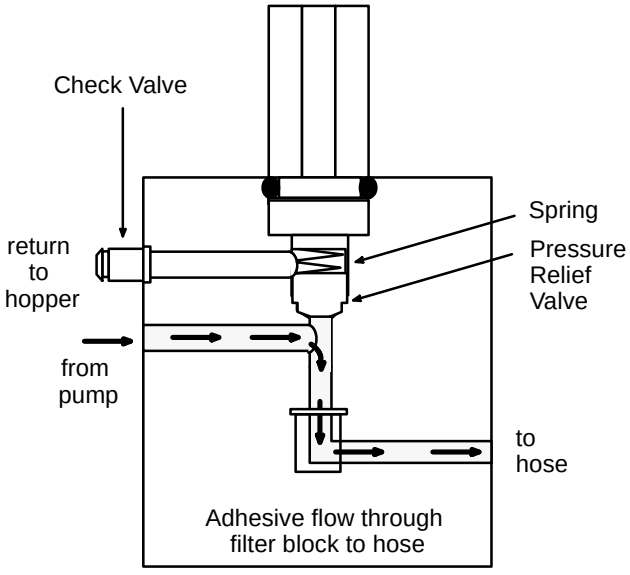
The valve is adjustable and it does not affect adhesive pressure under normal operating conditions. The adjustable pressure relief valve is factory set at 34 bar (500 psi) for Dynamelt M gear pumps.

When adhesive pressure exceeds the set limit, the pressure forces the valve to move away from its seat, compressing the spring and allowing adhesive to flow back to the hopper. This adhesive flow reduces pressure. When the pressure falls below the set limit, the spring forces the valve against its seat, cutting off adhesive flow.

The check valve, seen below, is not instrumental in pressure relief. It serves as an overflow valve, preventing adhesive from flowing out of the hopper when the filter plug is removed.

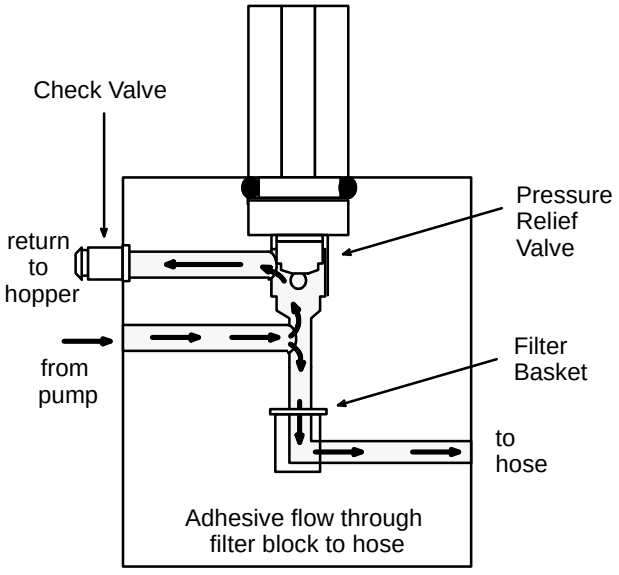
Normally Closed (Unrelieved):

In the drawing below, the pressure relief valve is closed.



Open (Relieved):

In this drawing, pressure has exceeded the setting of the valve, causing it to open and discharge adhesive to the hopper.



Operation of the Adjustable Adhesive Pressure Relief Valve

Operation of the ASU's Gear Pump

Manual or Automatic Pump Operation

Choose "Manual", "OFF" or "Auto" gear pump operation from the Motor Programming screen on the PanelView keypad. When the Dynamelt's pump is to be operated manually (that is, without a line following signal), the manual mode is used to control pump speed (and adhesive output). For the gear pump to be operated in the automatic mode, a tach generator, or equivalent (attached to the parent conveyor line) must be provided and the following set-up procedure should be performed:

1. The tach generator or the signal isolator must be adjusted so that the voltage from the speed controller is 0 to10 VDC (but not more than +10 VDC when the conveyor is at maximum speed). This voltage is measured at either the analog input card, typically at TB2 on I00100 and I00101 (for a tach generator) or at terminals 9 (+) and 10 (-) of the signal isolator board.

2. The "Auto" setting then changes pump speed for any given 0 to +10 VDC incoming tachometer signal. Voltage will vary given production speed.

The motor speed can be adjusted (trimmed) in auto mode by setting maximum and minimum pump speed (rpm) values on the controller's keypad. MAX pump speed will be the true motor speed at 10 volts input. This value cannot exceed 100%.

To make this motor speed adjustment, follow the programming instructions in Chapter 5.

Pump Operation

When the adhesive in the ASU's hopper has reached a temperature high enough for the pump to operate safely, the controller will place the hopper in "Ready" condition and power will be supplied to the pump. The pump is self-priming.

Pump output is adjusted from the Motor Programming screen on the controller's keypad. However, if less pressure is needed, maximum pressure of the pump can be decreased (or increased) by adjusting the pressure relief valve installed on the pump output manifold. To change the setting of this valve, loosen the locknut and turn the allen screw clockwise to increase pressure or counterclockwise to decrease pressure. The relief valve is factory set at 34 bar (500 psi) for Dynamelt M gear pumps.

Troubleshooting the ASU's Gear Pump

No special tools are needed for working on the ASU pump. See Chapter 8 of this manual for diaassembly/ assembly procedures for the ASU pump, and Chapter 10 for locating pump parts on the component illustrations (exploded-view drawings).

Gear Pump Priming/ Start-Up

The pump is self priming.

CAUTION: DO NOT continue to run the pump if no glue is coming out. This could damage the pump since it uses the glue as a lubricant. Stop and troubleshoot.

Gear Pump Troubleshooting Guide

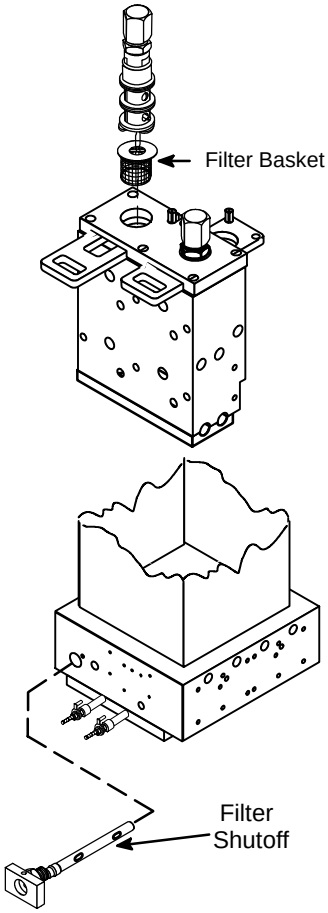
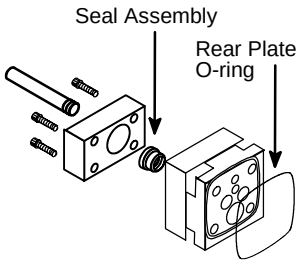
WARNING HOT SURFACE & ADHESIVE

Some of the procedures in the following Troubleshooting Guide require working near hot adhesive. Be sure to wear protective gloves, safety glasses and clothing and use proper tools for handling hot melt components.

Note: Each motor in the system can run independently (or dependently) and may have its own operating parameters. Therefore, each motor should be troubleshot independently.

Problem	Possible Cause	Solution
Pump doesn't operate in "Manual" mode.	1. Motor on/off is off at the controller keypad.	1. Check keypad setting.
	2. Hopper temperature is below ready setpoint.	2. Pump cannot operate until hopper has reached ready condition. Verify that hopper has reached ready. Re-program hopper operating setpoint and ready setpoint if necessary.
	3. No incoming electrical power.	3. Check to see if ASU temperature control is operating. If not, check for presence of incoming supply voltage.
	4. If pump on/ off is being controlled by a remote switch (i.e., a hand-held, applicator), the switch or switch circuit may be open.	4. Check condition of the remote switch (the hand-held applicator).
	5. Inoperative SLC 160 drive.	5. If the drive is inoperative it must be replaced.
	6. Low temp alarm.	6. Verify that ASU is warmed up and that hopper temperature is above the factory-set pump enable temperature.
	7. Drive circuit breaker tripped.	7. Refer to schematic (Ch. 11) to locate circuit breaker. With an ommeter, verify that the drive input is not shorted. If it is shorted, replace the drive. Reset the breaker, if it trips again, replace the breaker.

Problem	Possible Cause	Solution
Pump doesn't operate in "Auto" mode, hopper is at ready conditon.	1. Parent machine is not running.	1. Check parent machine.
	2. "Auto" motor is set at zero (at controller keypad).	2. Re-program motor.
	3. No incoming line following signal.	3. Check for presence of 0 to 10 VDC control signal at analog input card. If signal is not present, check ASU wiring connections and tachometer drive connections. If control signal is present there, the problem is within the ASU.
	4. Low temp alarm.	4. Verify that ASU is warmed up and that hopper temperature is above the factory-set pump enable temperature.
Pump runs but there is no adhesive output.	1. ASU is out of adhesive.	1. Add adhesive to hopper.
	2. If pump has been serviced and leads reversed, pump will run with no output.	2. Check pump wiring to schematic.

Problem	Possible Cause	Solution
Low or inconsistent adhesive output. 	1. Pump filter clogged.	1. Remove and inspect filter basket and filter shutoff.
	2. Adhesive used is too viscous.	2. Verify that system components are at appropriate temperatures and that the selected adhesive is correct for the application.
	3. Clogged hose.	3. Inspect hose for kinks or internal plugs of debris or char. Clean or replace hoses as necessary.
	4. Clogged applicators.	4. Inspect applicators for plugged nozzles or filters. Clean or repair applicators as necessary.
	5. The fixed pressure relief valve is opening.	5. When fully closed (clockwise) and all applicators are off, adhesive pressure should be around 34 bar (500 psi). If it is significantly less, the pressure relief valve should be replaced.
	6. Inoperative lower o-ring in filter plug is allowing pressure to escape.	6. Replace o-ring. Follow diagram and instructions in Chapter 6 for “Outlet Filter” to locate the o-ring.
Adhesive leak at pump shaft seal. 	1. Pump seal is incorrectly positioned inside the seal and bearing assembly.	1. Remove seal and bearing from pump. Verify that all components are correctly positioned.
	2. Pump seal inoperative.	2. Remove seal from pump, inspect it and replace it if worn or damaged. Be sure there are no burrs or other sharp edges on the rear plate o-ring groove that could damage a new o-ring.
Adhesive leak at pump-to-hopper interface.	1. Pump assembly screws are missing or loose.	1. Verify that all four pump screws are tightly assembled to the hopper.
	2. Helicoil insert pulled out of hopper.	2. Remove pump and inspect bottom of hopper. Repair or replace hopper as necessary.

Chapter 8
DISASSEMBLY & RE-ASSEMBLY PROCEDURES

Note: Re-read Chapter 1 "Safety Precautions" before performing any disassembly procedures. All disassembly and repair procedures must be performed by qualified, trained technicians.

Disassembly Procedures

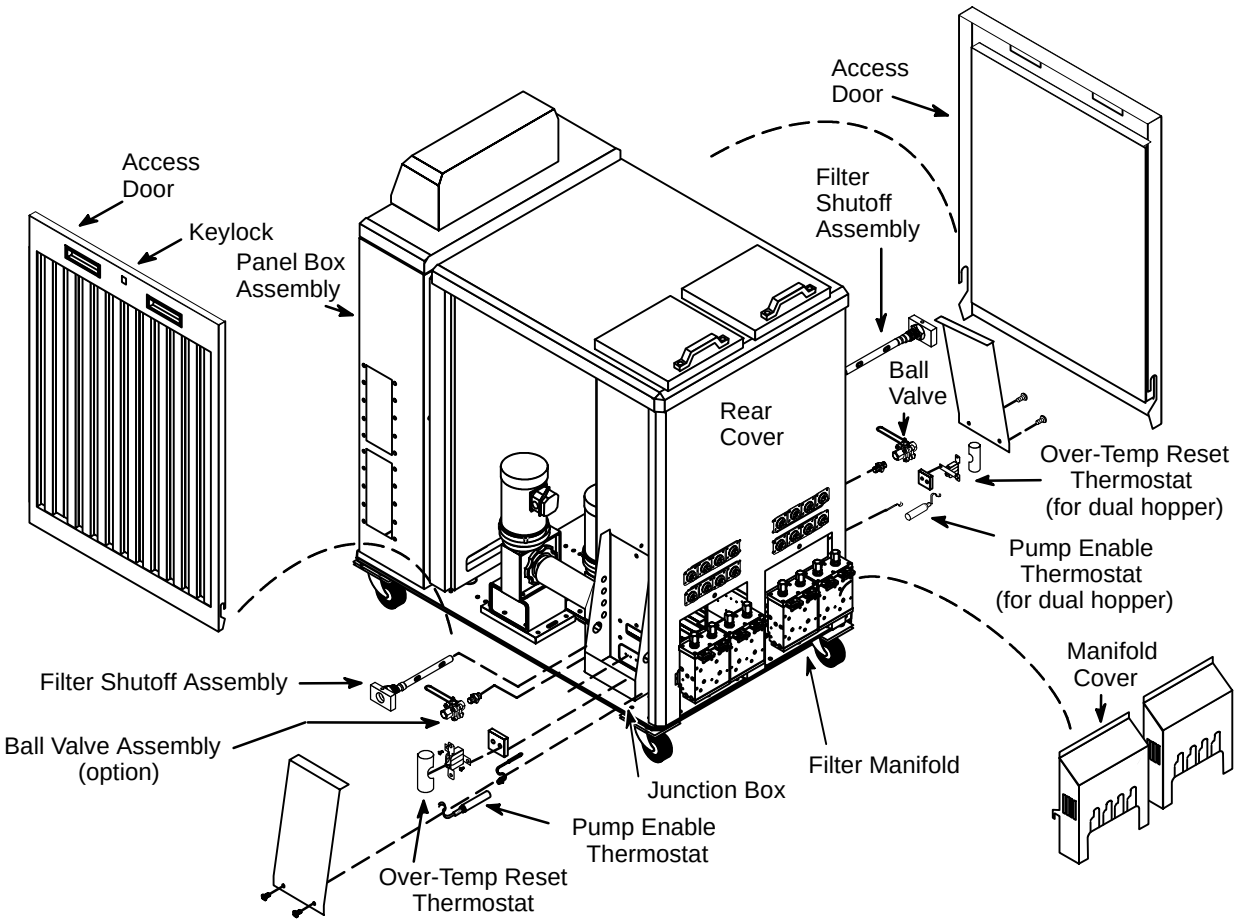
Note: Use the exploded-view drawings referenced with each procedure in conjunction with the instructions outlined in this chapter. Read the "cautions" on page 8-5 before re-assembling the ASU.

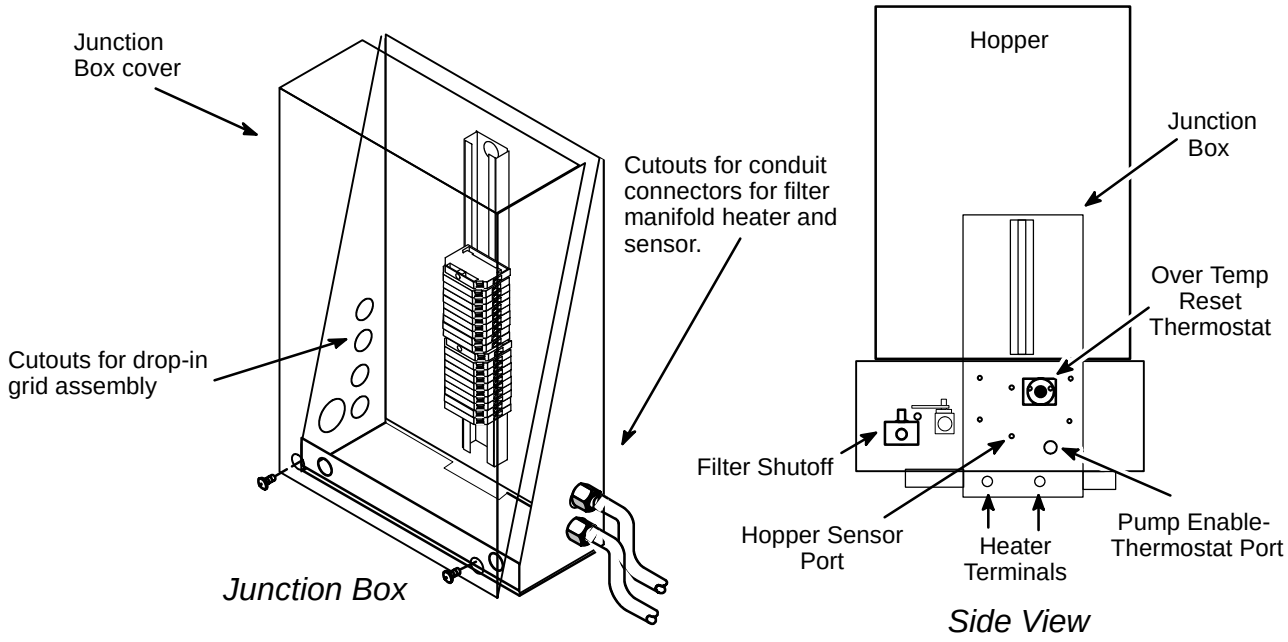
To Remove the Access Doors

There are two access doors, one on either side of the ASU. Use the key to unlock the door, then lift it off, being careful not to pull off the ground wire attached. Remove the ground wire and re-attach when the door is re-installed. These doors allow access to: the motor, pump, junction boxes, (optional) drop-in grids, filter shutoffs and (optional) ball valves.

To Open Junction Boxes

There are two junction boxes, one on either side of the hopper(s). A junction box cover is removed by two screws at the bottom of the box. Within the juction boxes are thermostats, heater terminals and the hopper sensor. See also the detailed illustration on the following page.





Sensor or Thermostat Replacement

Remove the junction box cover.

a. **Over-Temperature Thermostat Replacement:** Remove the two screws and slip the terminals and the hopper ground wire off of the thermostat before removing the thermostat from the base of the hopper.

b. **Pump Enable Thermostat Replacement:** Disconnect two wires from the terminal strip and slide the thermostat out.

c. **RTD Sensor Replacement:** Disconnect two wires from the terminal strip and slide the sensor out.

To Remove the Manifold Cover

Unscrew its captive screw and slide cover off. Cover allows access to the hose connections on the filter manifold, outlet filters, heaters and the pressure relief.

Heater Replacement

The heaters are located underneath the hopper.

Remove the access door. Use a hex head socket wrench to remove the six heater plate bolts. Disconnect the heater wires. Slide the old heater plate out. Connect heater wires to new plate. Slide new plate in place and fasten with the six bolts.

To Remove Rear Cover

No customer replaceable components are behind the rear cover. To remove: remove the two access doors in order to access and remove the five screws which hold the rear cover in place. Two screws are located in the upper corners of the rear cover. Three screws are located across the bottom of the cover.

To Access the RTD Sensor in the Optional Drop-in Grid

Remove the access door. Remove the screws on the drop-in grid's junction box cover in order to remove the cover. Disconnect the sensor from the terminal strip inside the junction box and slide the sensor out of its adapter.

To Access Electrical Components inside the Panel Box

DANGER HIGH VOLTAGE

Dynamelt systems use electrical power that can be life threatening. Disconnect and lock out input power to the application system before starting any disassembly procedure.

Verify again that the main power is OFF. On the outside of the panel box, use the main disconnect switch to open the panel box door (see Chapter 3 for instructions on opening door).

a. **Fuse Removal:** Transformer fuses are located on the upper terminal rail (item #18 on page 10-7).

b. **Relay Removal:**

1. The solid state relays (item #14 on page 10-5) are located on the right-hand side of the inside of the panel box, behind the heat sinks(s). Two screws hold each relay. They also plug into a connector.
2. Drive relays (one relay per drive) are located on the terminal rail (item #31 on page 7). Push the lever located below these relays to release them from the rail.

c. **SLC 500 Module Removal:** Open the door of the selected module to expose the wires and terminals within. Disconnect wires from all terminals. Press and hold the two module retainer clips simultaneously (located at the top back and bottom back of each module), then gently pull the module straight out of its slot on the rack. *To re-install module:* align the module's circuit board to the rack's card guide and slide the module in until both the top and bottom retainer clips engage.

To Access the Pump or Motor

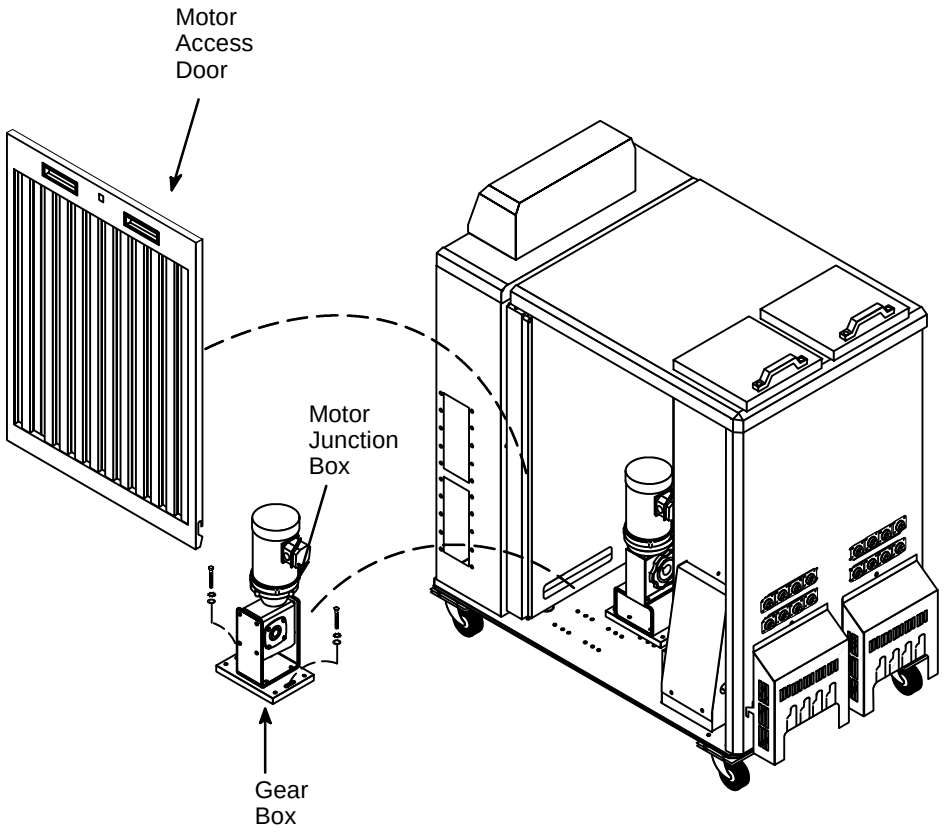
DANGER HOT SURFACE & HIGH VOLTAGE

If the pump is not operable but the heating system will function, raise the temperature of the application system to the operating temperature to aid in the pump disassembly process. Otherwise, a heat gun or other controlled heating method is recommended to melt hardened hot melt material. Never use a torch or an open flame on any of the components of the application system. Once the system is up to temperature, disconnect all incoming power before proceeding.

Remove access door(s) using the key, being careful not to pull off the ground wire attached. Turn OFF the filter shutoff valve by turning it to its closed "0" position.

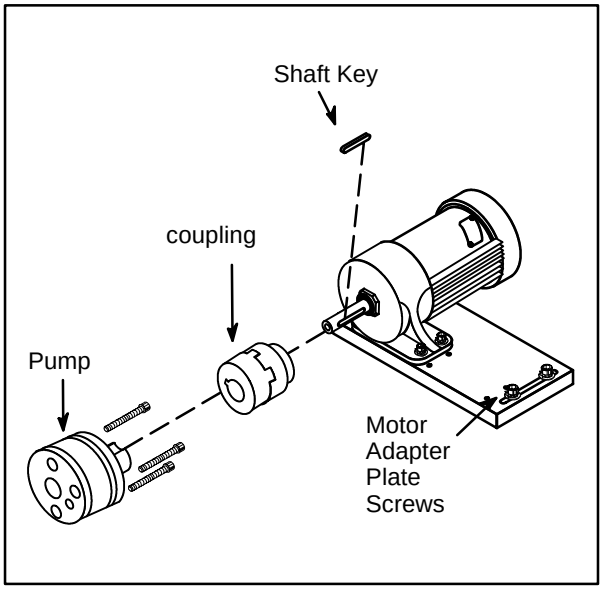
a. **Motor Removal:** Open the motor junction box cover (2 screws). Inside the junction box, disconnect the wires leading to the motor. On the outside of the junction box, unscrew the hex nut conduit fitting. Slide the wires through the conduit fitting. Remove the four bolts which attach the motor to the gear box. Lift the motor up and out of the ASU.

For re-assembly: torque should be approximately 1.8 Nm (16 foot/lbs) at room temperature. With hopper at 177°C (350°F), the maximum allowable torque on screws is 4.1 Nm (36 foot/lbs).



b. **Pump Removal:** Verify that the filter shutoff is in its closed "0" position. Loosen motor adapter plate screws and slide adapter plate with motor away from pump and coupling. Slide the coupling off the pump shaft. Remove the four pump mounting bolts.

c. **Pump Seal (O-ring) Replacement:** Remove the pump from the ASU (see instructions above, "b"). Remove the external pump seal from its groove on the back of the pump adapter plate (this is the seal located between the adapter plate and the hopper). Install the new seal.



Re-Assembly Procedures

Unless noted, the M Series ASU's re-assembly is simply the reverse sequence of the disassembly procedures. However, the following "cautions" should be followed (whenever they apply) for proper re-assembly:

WARNING HOT SURFACE

It order to protect personnel and equipment, it is important to replace all insulation whenever it is removed from the ASU.

CAUTION: In general, all *O-RINGS AND SEALS* should be replaced whenever hot-melt equipment is re-assembled. All new o-rings should be lubricated with o-ring lube (PN N07588).

CAUTION: *TAPERED PIPE THREADS* are found on air line fittings used with the pump air supply (if applicable) and on the outlet filter manifold. Apply thread sealant (PN N02892) whenever tapered pipe threaded parts are re-assembled.

CAUTION: *SOME FITTINGS* used for adhesive on the ASU have straight threads and o-ring seals. Use of thread sealant is not necessary with these parts, but the o-ring seals should be clean and lubricated. Tighten straight-threaded parts and fittings until their shoulders are firmly seated against the pump body (or other surface). Excessive torque may damage straight-threaded parts and the use of power wrenches is not recommended

CAUTION: *HOT-MELT RESIDUE* should be cleaned from parts before they are re-assembled, particularly from threaded parts. As a precaution against adhesive residue preventing proper re-assembly, threaded parts should always be re-tightened at operating temperature.

Chapter 9
AVAILABLE OPTIONS & ACCESSORIES

Pressure Gauge Assembly: PN 805641

An optional analog pressure gauge can be mounted on the outlet filter manifold. Reading the adhesive pressure at the manifold, rather than in-line on a hose, allows for more precise monitoring of system pressure. It is also useful for troubleshooting and maintenance.

The gauge is installed at one of the adhesive ports on the manifold. Fittings and adapter are included in the assembly.

Pre-PSI & Post-PSI Transducers: PN 804467/ 805942

The Pre-PSI transducer measures adhesive pressure in the filter manifold *before* the filter basket. The Post-PSI transducer measures the pressure *after* the filter basket. By comparing the two readings, the operator can determine if the filter basket is clogged. Pressure transducers are monitored via pressure readouts through the controller. See Appendix for manufacturer's manual.

Drop-in Grids: PN 104802

The drop-in grid is an extra heated grid(s) which is installed near the bottom of the ASU's hopper. The additional grid(s) allows faster melting of adhesive for applications requiring higher melt rates and higher volumes of adhesive. When installed, the drop-in grid becomes an auxiliary temperature zone on the controller.

High-Temperature Heater Groups

More accurate temperature control may be gained by using a High-Temp Heater Group in the filter manifold/ pressure relief block. A heater and sensor are contained inside the block and become their own temperature zone on the controller. Six groups are available depending on the number of filter manifolds on the ASU.

Filter Options and Accessories:

40 Mesh Outlet Filter: PN 101246

Some situations do not call for a fine mesh outlet filter. A "clean" adhesive or one with a long pot life are examples. Systems utilizing lower temperatures or systems running in a clean environment can also utilize a 40 mesh filter. Standard equipment on Dynamelt is a 100 mesh filter (PN 101247).

Pump Options and Accessories:

Gear Pumps

For higher tolerances and precision, several gear pumps are available for the Dynamelt. Gear pumps give better service for continuous applications or applications which require more control over the volume of adhesive pumped. Gear pumps available are:

Single Pumps:

PN 100860: 1.54 cc/rev single, standard accuracy gear pump
PN 100861: 3.2 cc/rev single, standard accuracy gear pump
PN 100862: 4.5 cc/rev single, standard accuracy gear pump
PN 109690: 10 cc/rev single, standard accuracy gear pump
PN 108875: 8.5 cc/rev single, high accuracy gear pump
PN 084E374: 0.584 cc/rev single, high accuracy gear pump

cont.

PN 084E376: 1.752 cc/rev single, high accuracy gear pump
PN 084E428: 0.297 cc/rev single, high accuracy gear pump
PN 084E430: 1.168 cc/rev single, high accuracy gear pump
PN 084E434: 2.920 cc/rev single, high accuracy gear pump

Dual Pumps:

Note: all dual pumps require PN 102049, see below.
PN 100863: 1.54 cc/rev dual, standard accuracy gear pump
PN 100864: 3.18 cc/rev dual, standard accuracy gear pump
PN 084E389: 0.584 cc/rev dual, high accuracy gear pump
PN 084E432: 1.168 cc/rev dual, high accuracy gear pump
PN 108874: 2.920 cc/rev dual, high accuracy gear pump

Hi-Flow Pumps:

PN 110289: 20cc/rev single, gear pump, TSHA
PN 110290: 30cc/rev single, gear pump, TSHA
PN 110291: 45cc/rev single, gear pump, TSHA

Feinpruf Pumps

Often preferred by the European market where they are readily available.

Gear Pump Repair Kit: PN 103151

Contains the following items needed to repair the PNs 100860 thru 100864 gear pumps:

PN	Description	Qty.	PN	Description	Qty.
N00198	O-ring	2	069X064	O-ring	3
018X031	Ball Bearing	5	078F017	Ring, Clip	4
069X061	Seal	1	078I001	Key, Woodruff	1

Return (re-circulating) Hoses

Available on all models. Use of return hoses allows higher adhesive pressures from the head to the substrate because the head is “overfed” adhesive. The overflow adhesive is re-circulated to the hopper.

Pneumatic Clutch PN 106877

A clutch is available to relieve adhesive pressure quickly in applications where there are periods of time when adhesive is not being applied.

Level Control Options

Single-Point Level Control Kit: PN 810237 (DMM140 & DMM210 only)

Multi-Point Level Control Assembly: PN 084Q210 (DMM140 & DMM210 only)

Level control devices inform the operator, via a message on the controller, that the hopper’s adhesive level is low. They may also be wired to stop production, turn on an alarm light or signal, or signal a PLC.

Pressure Transducer Assembly: PN 801122

A pressure transducer is an electronic probe that allows the melted adhesive's pressure to be processed by the ASU's control system. They are used to monitor system operating pressures and their limits. They troubleshoot clogged nozzles and filters.

Dual Hopper

Available on DM M70, M140 and M210. The adhesive hopper on the dual hopper models is divided into two separate chambers to allow the application of two different adhesives simultaneously. Each chamber is an independent temperature zone, allowing them to operate at different adhesive temperatures.

High Flow ASUs: PN 106696 = DM140/ PN 106697 = DM210

These ASUs are available as DM M140 or M210 units for applications requiring a pump rate up to 2,625 cc/min per pump. The high flow models are equipped with high flow grid groups, including high flow hoppers, filter shutoff assemblies, filter manifolds and filter baskets.

Controller Options

On PLC-controlled models, ITW Dynatec supplies an Allen-Bradley SLC 500 system, including their DeviceNet communication module and 160 drive(s).

As an option to the SLC system, Allen-Bradley's Control Logix systems are offered for customers who desire more universal communications. Among the communication modules available for Control Logix ASUs are DeviceNet, EtherNet and ControlNet. Drives available are either the 160 or PowerFlex.

SLC 5/04 CPU 64K
SLC 5/05 CPU 32K with Ethernet

The above listed Allen Bradley SLC 500 CPU options are available for systems which require additional memory and/ or networking capability than supplied by the standard SLC.

Control Logix CPU Models

The Control Logix-controlled system's communication modules and electronic drives are chosen to meet the specific needs of individual customers. Call your Dynatec sales representative to discuss your options.

Pressure Display

The pressure display option enables the controller to read and display adhesive pressure (PSI or BAR) in the ASU's outlet filter manifold. A pressure reading device (transducer or gauge) is mounted on the outlet filter manifold.

Line Speed Tracking

This option allows the speed of the motor and ASU to follow the speed of a production line via a reference voltage input. One of the following devices must be installed:
PN 015D050 Tach Generator: a mechanically operated device which produces a reference voltage that allows the ASU's gear pump to track a parent machine's production line speed.
PN N06642 Signal Isolator: a device which conditions a parent machine's production line's DC speed reference voltage to allow the ASU's gear pump to track line speed.

Remote HMI Interface

An option that allows controller monitoring and adjustments from a customer-provided programmable logic controller (PLC) or a remote location.

Recommended Service Parts List

Category	Part No.	Description	Qty.
Electrical:	103184	Fuse GDC4 (terminal rail)	3
	036B103	RTD Sensor, PT	2
	N07958	RTD Sensor, PT	1
	104166	Over-Temp Thermostat & Insulator Assy.	1
	036B015	Pump Enable Thermostat	1
	102411	Boot, Insulator	2
	105261	Relay, 120v	2
	048H384	Solid State Relay, Dual	16
	036A077	Heater, 2000w	2
	036A170	Heater, 500w (for 1 filter block)	1
	036A079	Heater, 1000w (for 2 filter blocks)	1
	102149	Heater, 1500w (for 3 filter blocks)	1
	036A077	Heater, 2000w (for 4 filter blocks)	1
	801680	Printed Circuit Board, SLC 5/04	1
	802101	Printed Circuit Board, SLC DeviceNet	1
	802110	Power Supply, AB	1
	801684	Module, RTD	1
	801688	Module, I/O	1
	802111	Module, DN, 160 Drive	1
	802693	Module, SLC, Analog, 8 Input	1
	802694	Module, SLC, DC, 32 Output	1
	802711	Power Supply, 15VDC, 40w	1
	802109	Drive, AB 160, 240 VAC, 3P, 1HP	1
	804914	Drive, AB 160, 480 VAC, 1HP	1
	ACG-3	Fuse, SLC Power Supply (locally available)	1
	1747-BA	Battery, SLC Processor (locally available from AB)	1
O-rings:	N00181	O-ring 014 (outlet filter/ manifold)	16 + 6 per manifold
	A69X133	O-ring 124 (outlet filter/ manifold)	2 per manifold
	N00185	O-ring 018 (outlet filter/ manifold)	2 per manifold
	N00187	O-ring 020 (outlet filter/ manifold)	2 per manifold
	069X275	O-ring 122 (outlet filter/ manifold)	2 per manifold
	N00199	O-ring 114 (outlet filter/ manifold)	2 per manifold
	103770	O-ring 5-005 (outlet filter/ manifold)	2 per manifold
	103771	O-ring 5-254 (outlet filter/ manifold)	2 per manifold
	N00192	O-ring 032	4
	N00173	O-ring 006	2
	807729	Pump Shaft Seal (Zenith/ TSHA pump models)	2 per pump
	069X061	Pump Shaft Seal (optional ITW Dynatec pumps)	2 per pump
	069X289	Pump Shaft Seal (Hi Flow pump models)	2 per pump
	see IBOM	Pump Adapter O-rings	1 of each per pump
Filters:	101247	Filter Basket, 100 mesh	2 per manifold
	101246	Filter Basket, 40 mesh (optional)	2 per manifold
	006C156	High Flow Filter Basket (optional)	2 per manifold
	109482	Filter Basket, 200 mesh (optional)	2 per manifold
	105968	Filter Shutoff Assembly, Right	1
	105967	Filter Shutoff Assembly, Left	1
Misc:	N07588	Lubricant, O-ring	2
	L15653	Kit, Flushing Fluid, 1 gallon	1
	001U002	Hi-Temp Lubricant, tube	1
	102717	Check Valve (pressure relief)	1
	108012	Filter/ Pressure Relief Plug Assembly	1

Chapter 10
COMPONENT ILLUSTRATIONS & BILLS OF MATERIAL

WARNING

All parts must be periodically inspected and replaced if worn or broken. Failure to do this can affect equipment's operation and can result in personal injury.

Chapter Format

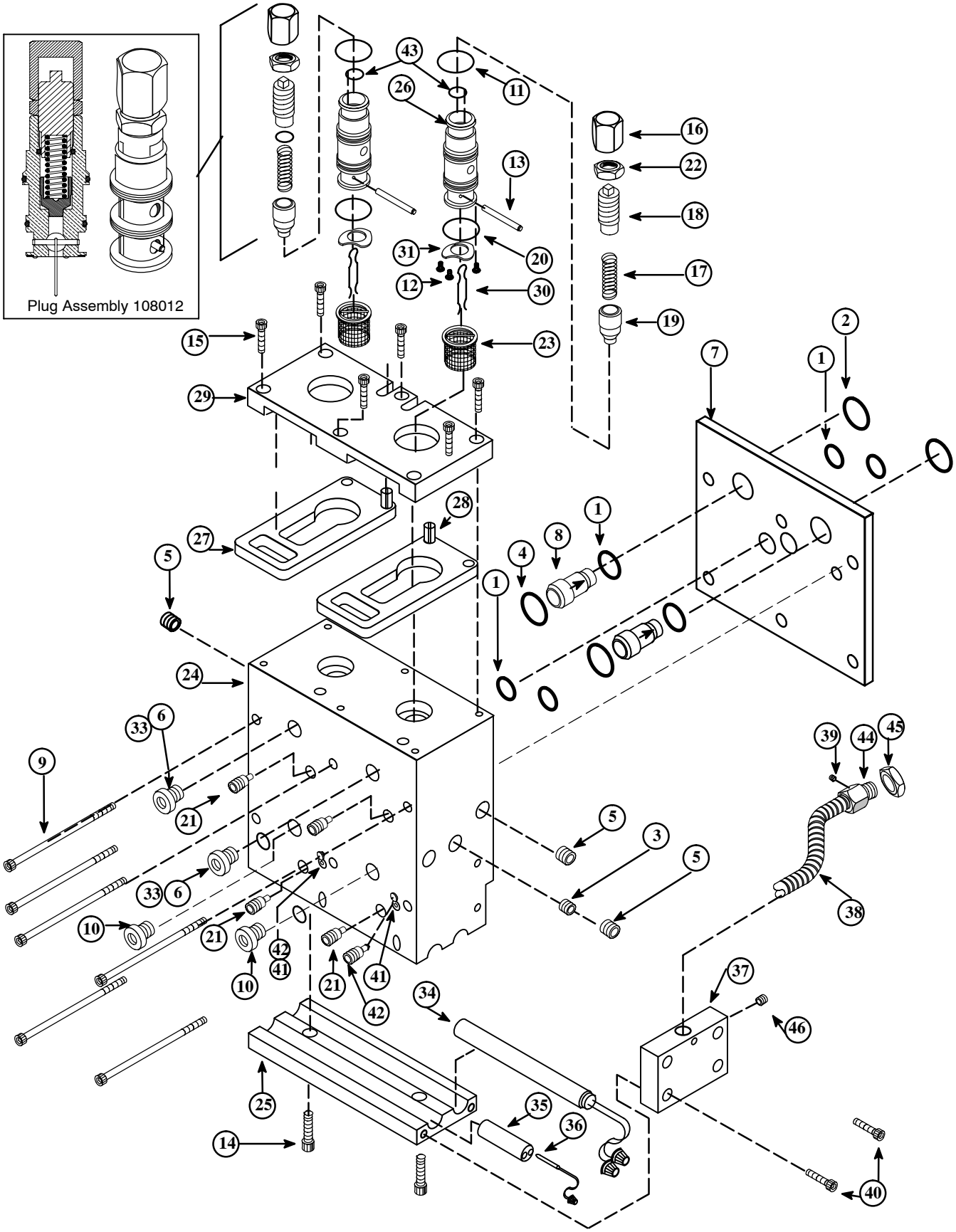
This chapter contains the component illustrations (exploded-view drawings) for each assembly of the DYNAMELT M SERIES ASU. These drawings are useful for finding part numbers as well as for use when maintaining or repairing the unit.

Because of the similiarities of the Model M70 and M140 ASUs, both are diagrammed on each illustration. When a part number is not identical, both models' part numbers are given with a note to distinguish between the two models.

Note: most common nuts, bolts and fasteners can be obtained locally at your hardware store. Specialty fasteners are available by contacting Dynatec's Customer Service.

Bill of Materials for Pressure Relief & High Temp. Filter Block Assembly #102710 (Items from Heater Control Groups: 103571, 103572, 103573, 103574 are also Included in this illustration and bill of material.)

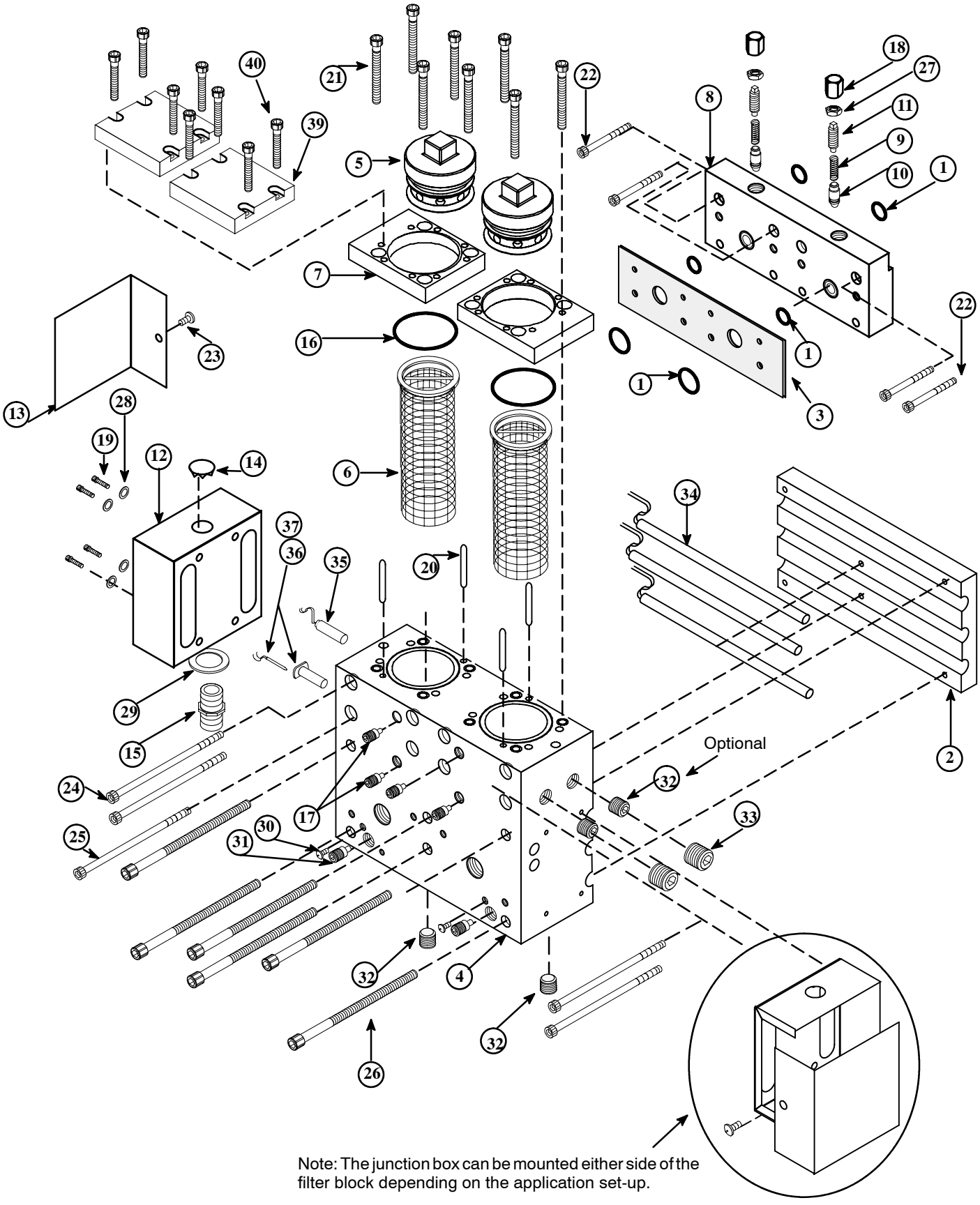
Item No.	Part Number	Description	Qty.
	102710	**Filter Block Top Assembly**	**1**
1	N00181	O-ring, 014	6
2	N00185	O-ring, 018	2
3	N00753	1/8 NPT Level Seal Plug	1
4	N00187	O-ring, 020	2
5	N00754	1/4 NPT Level Seal Plug	3
6	103626	3/8 BSPP Plug	2
7	102712	Filter Block Insulator Plate	1
8	102717	Check Valve, .655 Cart, 1 way	2
9	NPN	M8-1.25 x 90 SHC Screw	6
10	803173	1/2 BSPP Plug (803984 #06, 804155 #08, 803142 #12 hose fitting)	2
	108928	**Manifold Sub Assembly**	**1**
11	112667*	O ring, 124	2
12	A78A282*	#0 x 1/8 Drive Screw	6
13	N02969*	Pin Spring .125 x 1	2
14	105099	M8 x 25 SHC Screw	2
15	N07429	M8-1.25 x 30mm	6
16	006G112*	Cap, Adjustment Screw	2
17	012E002*	Pressure Relief Spring	2
18	109244*	Pressure Relief Adjustment Screw	2
19	109245*	Bullet, Hi-Pressure	2
20	112666*	O-ring, 122	2
21	104733	Plug, Pressure Transducer, 1/2-20	4
22	078D027*	3/4-16 Jam Nut	2
23	101246	Filter Basket, 40 Mesh	2
24	102711	Filter Block	1
25	102713	Filter Block Heater Retainer Plate	1
26	102714*	Pressure Relief/ Filter Plug	2
27	102715	Filter Plug Retainer Slide	2
28	N04349	Pin, Spring, .250 x .875	2
29	102716	Slide Housing Frame	1
30	102718*	Filter Pull Clip	2
31	102719*	Filter Preload Wave Spring	2
32	103770	O-ring, 5-005	2
33	103771	O-ring, 5-254	2
	103571	**Heater Control Section 240v, 1 block**	
	103572	**Heater Control Section 240v, 2 block**	
	103573	**Heater Control Section 240v, 3 block**	
	103574	**Heater Control Section 240v, 4 block**	
34	036A170	Heater,5/8 x 5", 240v, 500w (used with 1 Filter Block Assembly)	1
	036A079	Heater, 5/8 x 10", 240v, 1000w (used with 2 Filter Block Assemblies)	1
	102149	Heater, 5/8 x 15", 240v, 1500w (used with 3 Filter Block Assemblies)	1
	036A077	Heater,5/8 x 20",240v,2000w (Used with 4 Filter Block Assemblies)	1
35	036E032	Sensor Adapter	1
36	036B103	Temperature Sensor	1
37	107754	Cover, Hi-Temp Sensor & Heater Section	1
38	107645	Conduit, 10"	1
39	106156	M4 x 6mm SHSS	1
40	104163	M6 x 25mm SHC Screw	2
41	101833	10-32 x 1/2 Tamper Proof screw	2
42	104852	M10 x 12 cone, Relief, Set Screw	2
43	N00199*	O-ring, 114	2
44	107751	Conduit Fitting (located in junction box)	1
45	N06883	Jam Nut (located in junction box)	1
46	103570	M5 x 8 x 6, CUD SH Set Screw	1
	Note:	****These items are included in 108012 Plug Assembly***	



Component Illustration: Filter & Pressure Relief Assembly # 102710

Hi Vol. Filter & Pressure Relief Assembly # 809534

Item No.	Part Number	Description	Qty.
1	N00185	O-ring, #018	6
2	003D105	Heater Plate	1
3	006B043	Heat Isolator	1
4	809533	Block, Filter	2
5	806182	Filter Nut	2
6	807796	Large Filter Basket (20 Mesh, Option)	2
	807797	Large Filter Basket (40 Mesh, Option)	2
	807798	Large Filter Basket (80 Mesh, Option)	2
	807800	Large Filter Basket (120 Mesh, Option)	2
	807799	Large Filter Basket (100 Mesh, Option)	2
7	806188	Filter Retainer Plate	2
8	006G064	Block, Pressure Relief	2
9	006G078	Spring, Pressure Relief	2
10	012G001	Relief Piston	2
11	012G010	Pressure Relief Screw	2
12	048D141	Junction Box	1
13	048D142	Cover	1
14	N00220	Snap-In Hole Plug	1
15	048J022	3/8" St, Conduit Fitting	1
16	806206	O-Ring #333	2
17	104733	1/2 NPT Level Seal Plug	4
18	006G112	Cap, Adjustment Screw	2
19	078A005	10-24 x 1/2 SHCS	4
20	N04458	1/4 Dowel Pin	4
21	N00838	3/8-16 x 1 1/4SHCS	8
22	N00839	3/8-16 x 1 3/4 SHCS	4
23	078A164	10-24 x 1/2 HHSMS	1
24	N07790	3/8-16 x 4 1/4 SHCS	4
25	078A337	3/8-16 x 5 1/2 SHCS	4
26	078A379	1/4-20 x 4 1/2 SHCS	6
27	078D027	3/4-16 Jam Nut	2
28	078C005	Flat Washer, #8 SAE	4
29	078C021	Flat Washer, .88 x 1.0 x .13	1
30	101833	10-32 Tamper Proof Screw	2
31	807188	Plug, Drain	2
32	N00754	Level Seal Plug, 1/4	4
33	N00755	3/8-18 NPT Level Seal Plug	2
	807179	**Heater Control Section**	**1**
34	036A079	Heater, 5/8 x 10, 240v,1000w	3
35	036B013	T'Stat, Cartridge, N.C., 1/2 Dia.	1
36	106174	Sensor Adapter	1
37	N07958	Temperature Sensor	1
38	**807543**	**Hi Volume Filter Nut Cover Assembly (Option)**	**2**
39	807542	Cover Plate	1
40	N00817	1/4-20 x 1.25 SHC Screw	4

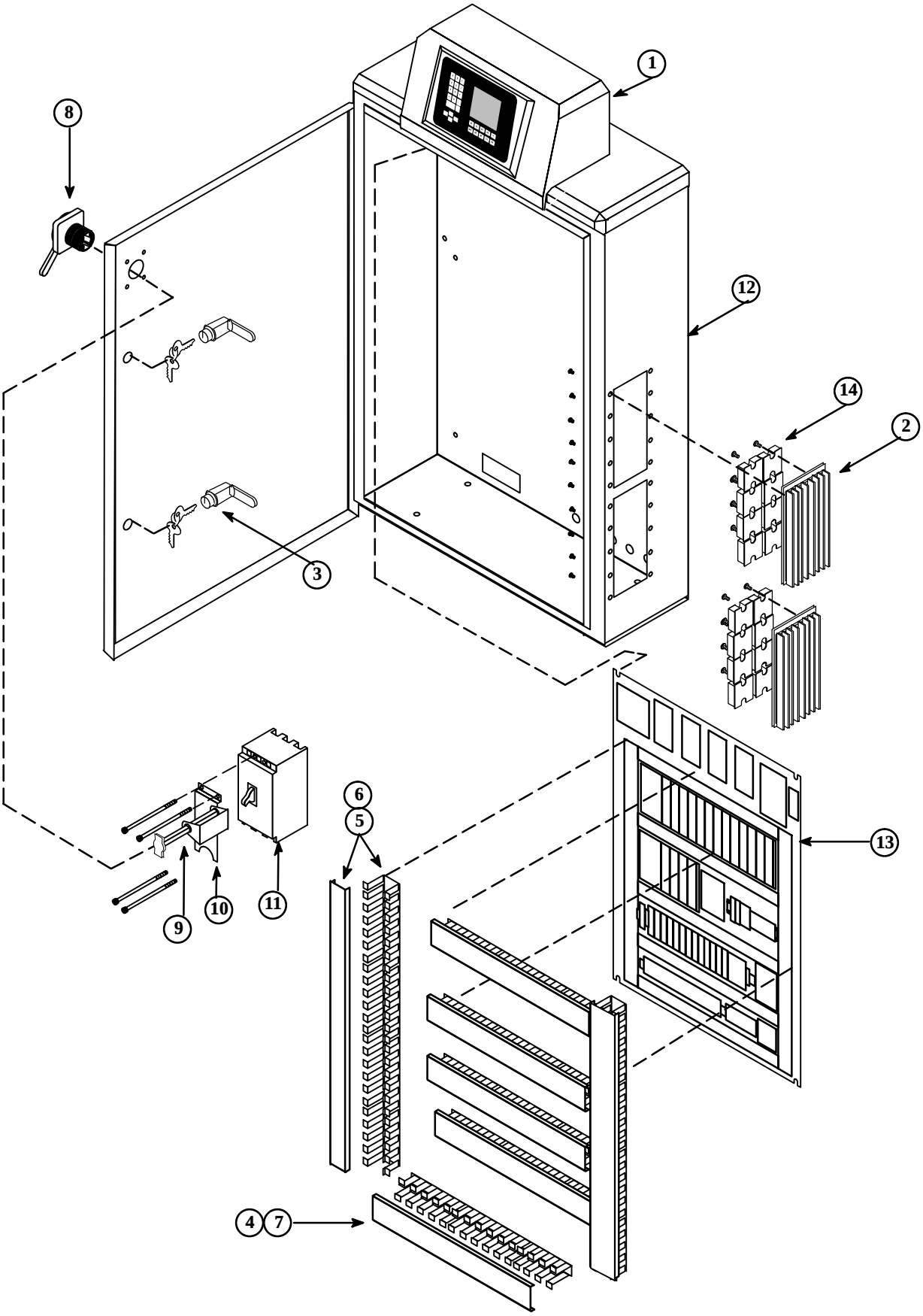


Component Illustration:Hi Vol. Filter & Pressure Relief Assembly # 809534

Bill of Materials for Typical Electrical Panel Box Assembly 802704

Item No.	*Part Number*	*Description*	*Qty.*
1	802710	Allen Bradley Panel View Kit (Color)	1
2	802626	Heat Sink	2
3	102329	Panel Box Lock Kit	2
4	103377	Wire duct, 1.5" W x 3" H	3
5	103378	Wire duct, 2" W x 3" H	3
6	103438	Wire Duct Cover, 2.25"	3
7	103438	Wire Duct Cover, 1.5"	3
8	104382	Rotary Handle	1
9	104383	Shaft, 8"	1
10	104384	Mechanical, Operator, Circuit Breaker	1
11	104767	Circuit Breaker,175A, 3P, 240V, ED Series	1
12	802657	Panel Box	1
13	802658	Insert Panel	1
14	048H384	SSR Dual 40A, 240VAC	16

Continued on pages 6 thru 7.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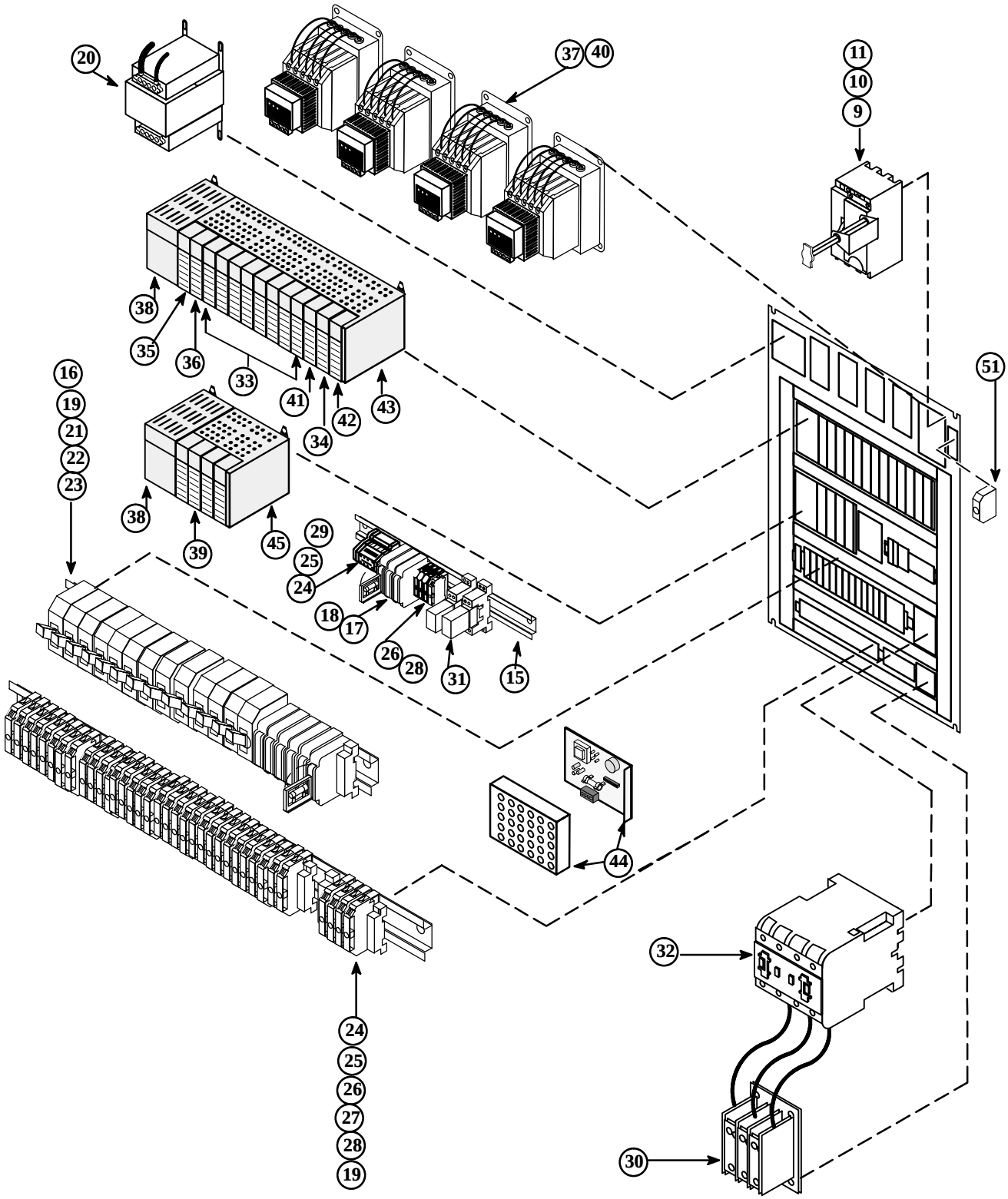
Bill of Materials for Typical Electrical Panel Box Assembly 802704 (Cont. from pg. 4)

Item No.	Part Number	Description	Qty.
15	048F159	Terminal Rail, 14”	1
16	103063	Circuit Breaker, 15A, 60F, 240V, 1P	6
17	103183	Fuse Block, Lever Open	3
18	103184	Fuse, GDC4, 250VAC	3
19	103425	Terminal Rail, 22”	2
20	103819	Transformer	1
21	104207	Circuit Breaker, 15A, 60F, 240V, 2P	1
22	104391	Circuit Breaker, 20A, DP	8
23	104392	Circuit Breaker, 30A, DP	4
24	105251	Terminal Block, Dual, 10A	5
25	105252	End Plate for105251	1
26	105253	Terminal Block Single, 20A	67
27	105254	End Plate for105253	9
28	105255	Terminal Block, Ground	12
29	105256	End Stop	6
30	105260	Distribution Block	1
31	105261	Relay, 120v w socket	2
32	105263	Contactor, 3P, 600V, 120V	1
33	801684	Module, RTD,1746-NR4	8
34	801688	Module, I.O., 12	1
35	802100	PCB, SLC	1
36	802101	PCB, SLC, Device Net	1
37	802109	Drive, AB, 160, 240v, 3P, 1HP	4
38	802110	Power Supply, AB,	1
39	802111	Module, AB, DN, 160 Dr	4
40	802599	Filter, 160 Drive, 240v, 3P	4
41	802693	Module, SLC, Analog, 8 Input	1
42	802694	Module, SLC, DC, 32 Output	1
43	802695	Rack, 13 Slot	1
44	802711	Power Supply, 15VDC, 40w	1
45	802697	Rack, 4 Slot	1
46	102286	Harness, Aux, Head (not shown)	4
47	102956	Harness, Hose, Head 8’ (not shown)	4
48	103099	Harness, Dual SSR to Dynacontrol (not shown)	16
49	105288	Harness, Aux Head 18’ (not shown)	4
50	105288	Harness, Hose/ Head 18’ (not shown)	4
51	TBD	Ground	1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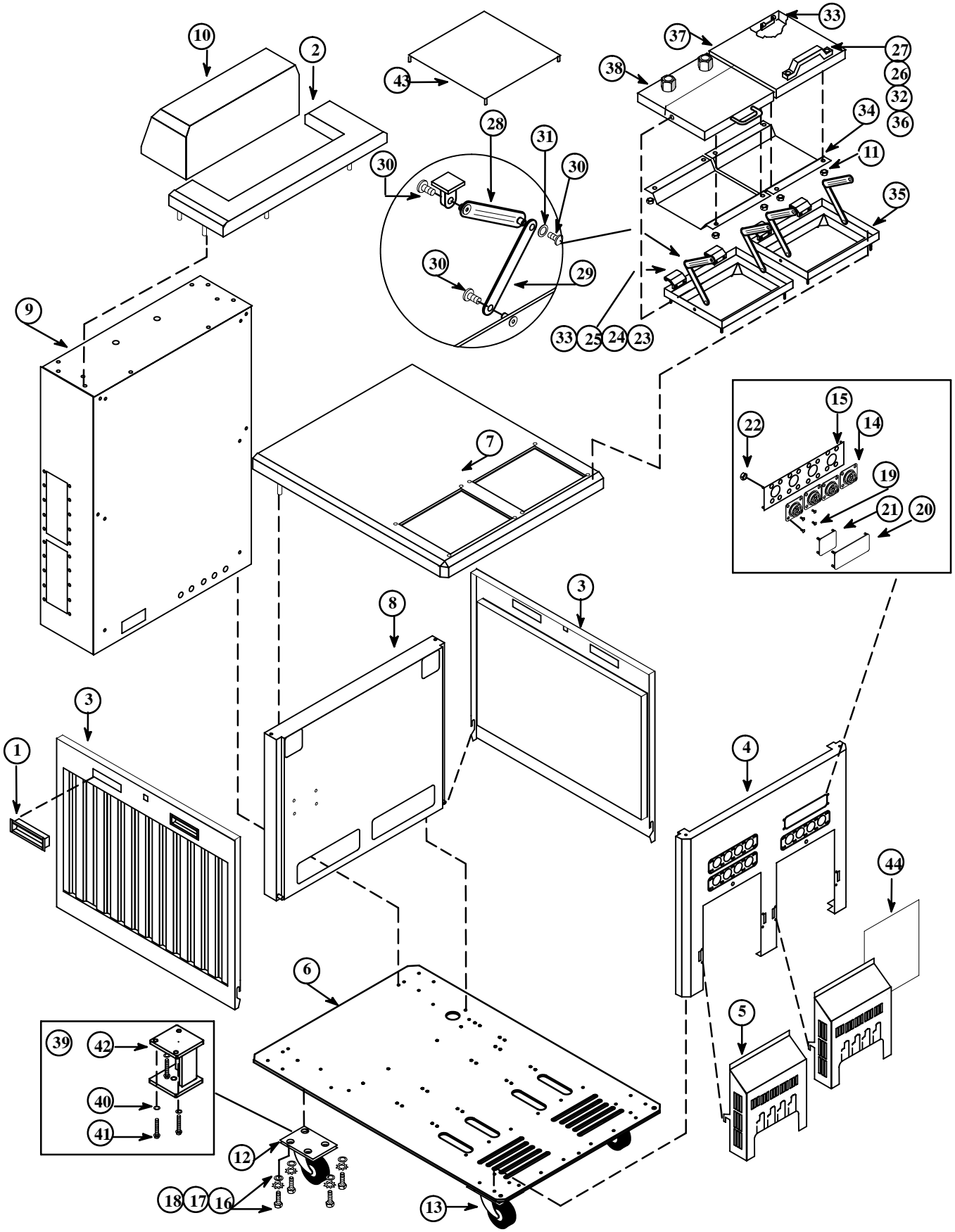
Bill of Materials for DYNAMELT M70 Series Cabinet Assembly (Base Unit 106045)

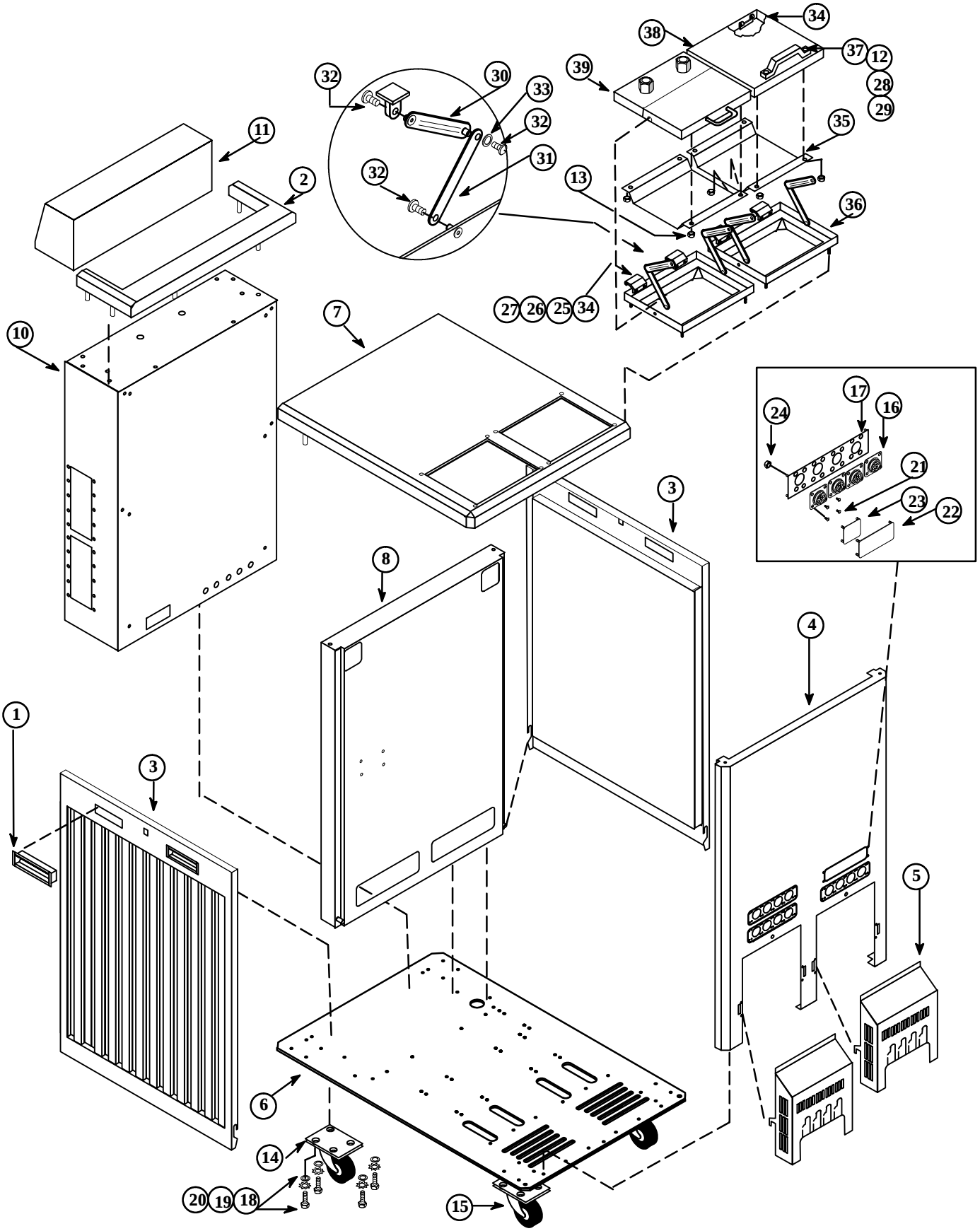
Item No.	Part Number	Description	Qty.
1	101843	Handle, Side Panel	4
2	105880	Panel, Top, Bracket	1
3	105886	Access Cover	2
4	105978	Rear Cover M70	1
5	107890	Manifold Cover	2
	108128	Manifold Cover, Hi Flow Only	
6	105891	Base Plate M70/140	1
7	105882	Top Panel M70/140	1
8	105975	Heat Barrier, Panel Box, M70	1
9	802657	Panel Box	1
10	802102	Mounting Bracket	1
11	106110	M5 Hex Nut	8
12	009E006	Swivel Caster	2
13	009E009	Rigid Caster	2
14	101074	Receptacle	8
15	103866	Bracket, Connector Bank, Amphenol	1
16	103516	M8 HHC screw	4
17		M8 Star Washer	4
18	078C008	5/16 Flat Washer	4
19	106111	M4 x 12 BHC Screw	16 or 64
20	101304	Blank Plate, Dual	0, 1 or 7
21	104279	Blank Plate, Single	0 or 4
22	105111	M3 Hex Nut	0, 4 or 16
	106048	**Lid Assembly**	**2**
23	105117	M4 x 8 Pan Head Screw	4
24	106236	M4 Star Washer	4
25	106876	Retaining Clip	2
26	106319	M6 Star Washer	4
27	105865	M6 Hex Nut	4
28	106772	Inner Hinge	2
29	106773	Outer Hinge	2
30	105152	M3 x 6mm PHLC Screw	6
31	106892	M3 Flat Washer	6
32	105101	M6 x 16mm HHC Screw	2
33		Hinge, Hopper lid	2
34	106770	Heat Deflector,	1
35	106771	Collar, Hopper	1
36	101842	Handle, Hopper, Lid	1
37	106769	Lid Hopper	1
38	**806399**	**Lid (with level cnt. mnt.) (807141 Lvl Cnt Assm.)** (option)	1
39	**808682**	**Optional ASU Leg Assembly 5.5"**	**1**
40	106321	Washer, Flat, M8, 9 x 17 x 1.6	12
41	108297	M8-1.25 x 20mm, HH Ser Fl	12
42	808778	Leg, Machine Support, 5.5"	4
43	810716	Lid Blank (option for one split hopper)	
44	805026	No Filter Cover Plate (option for one split hopper)	



Component Illustration: DM M70 Cabinet Assembly

Bill of Materials for DYNAMELT M140 Series Cabinet Assembly 106046

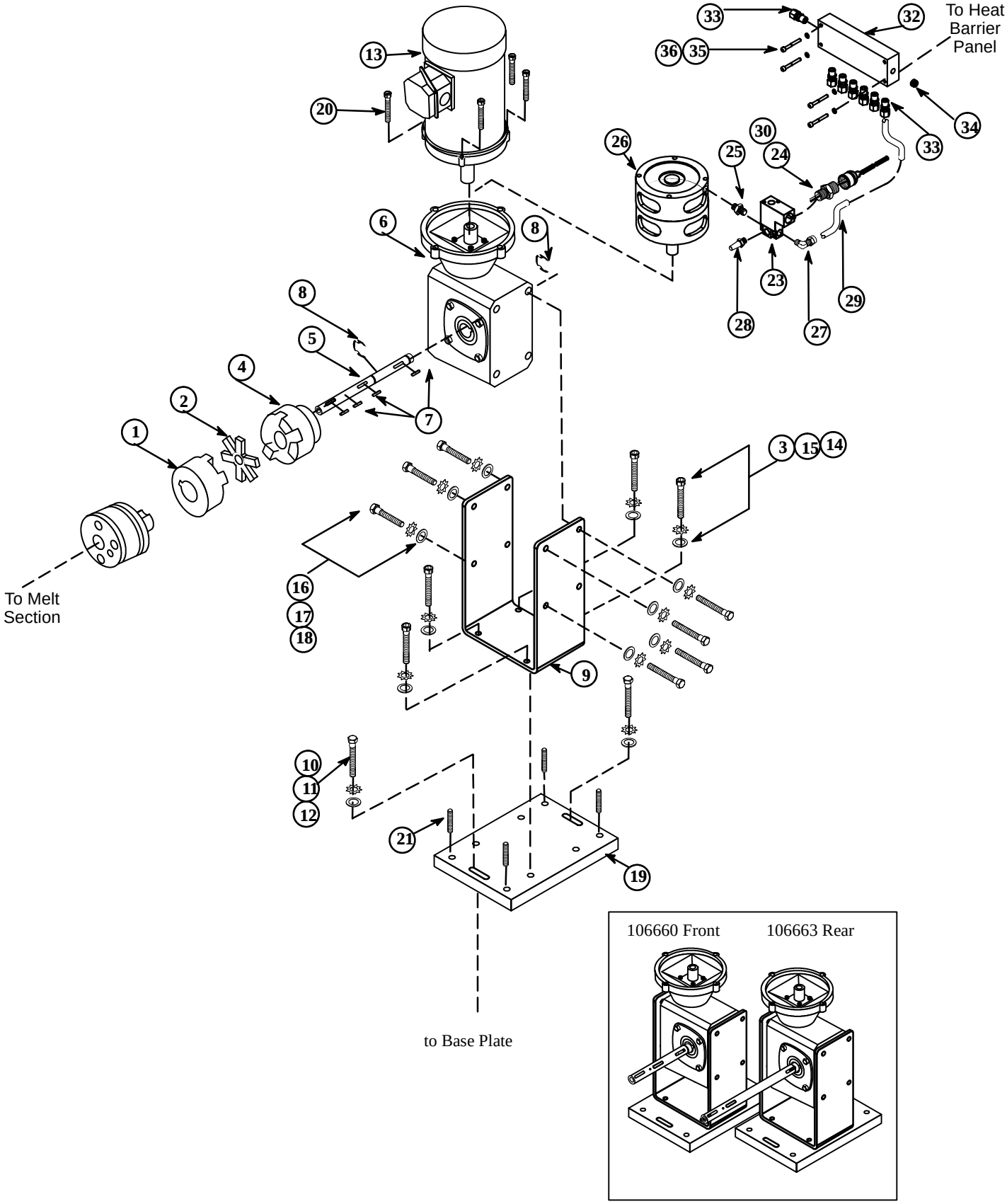
Item No.	Part Number	Description	Qty.
1	101843	Handle, Side Panel	4
2	105880	Panel, Top, Bracket	1
3	105887	Access Cover, M140	2
4	105979	Rear Cover, M140	1
5	107890	Manifold Cover	2
	108128	Manifold Cover, Hi Flow Only	
6	105891	Base Plate M70/140	1
7	105882	Top Panel, M70/140	1
8	105976	Heat Barrier, Panel Box, M140	1
9	101853	Lower Manifold Cover	2
10	802657	Panel Box	1
11	802665	Mounting Bracket, PV600	1
	802755	Mounting Bracket, PV550	1
12	105101	M6 x 16mm SHC Screw	4
13	107390	M6 Hex Nut	8
14	009E006	Swivel Caster	2
15	009E009	Rigid Caster	2
16	101074	Receptacle	8
17	103866	Bracket, Connector Bank, Amphenol	4
18	108296	M8 HHC screw	4
19		M8 Star Washer	4
20	106321	5/16 Flat Washer	4
21	106111	M4 x 12 BHC Screw	16 or 64
22	101304	Blank Plate, Dual	0, 1 or 7
23	104279	Blank Plate, Single	0 or 4
24	105111	M3 Hex Nut	0, 4 or 16
	106048	**Lid Assembly**	**2**
25	105117	M4 x 8 Pan Head Screw	4
26	106236	M4 Star Washer	4
27	106876	Retaining Clip	2
28	106319	M6 Star Washer	4
29	105865	M6 Hex Nut	4
30	106772	Inner Hinge	2
31	106773	Outer Hinge	2
32	105152	M3 x 6mm PHLC Screw	6
33	106892	M3 Flat Washer	6
34		Hinge, Hopper Lid	2
35	106770	Heat Deflector	1
36	106771	Collar, Hopper	1
37	101842	Handle, Hopper, Lid	1
38	106769	Lid Hopper	1
39	806399	**Lid (with level cnt. mnt.) (807141 Lvl Cnt Assm.)** (option)	1



Component Illustration: DM M140 Cabinet Assembly

Bill of Materials for DYNAMELT M70/ 140 AC Drive Assembly 106660 Front 106663 Rear, Special

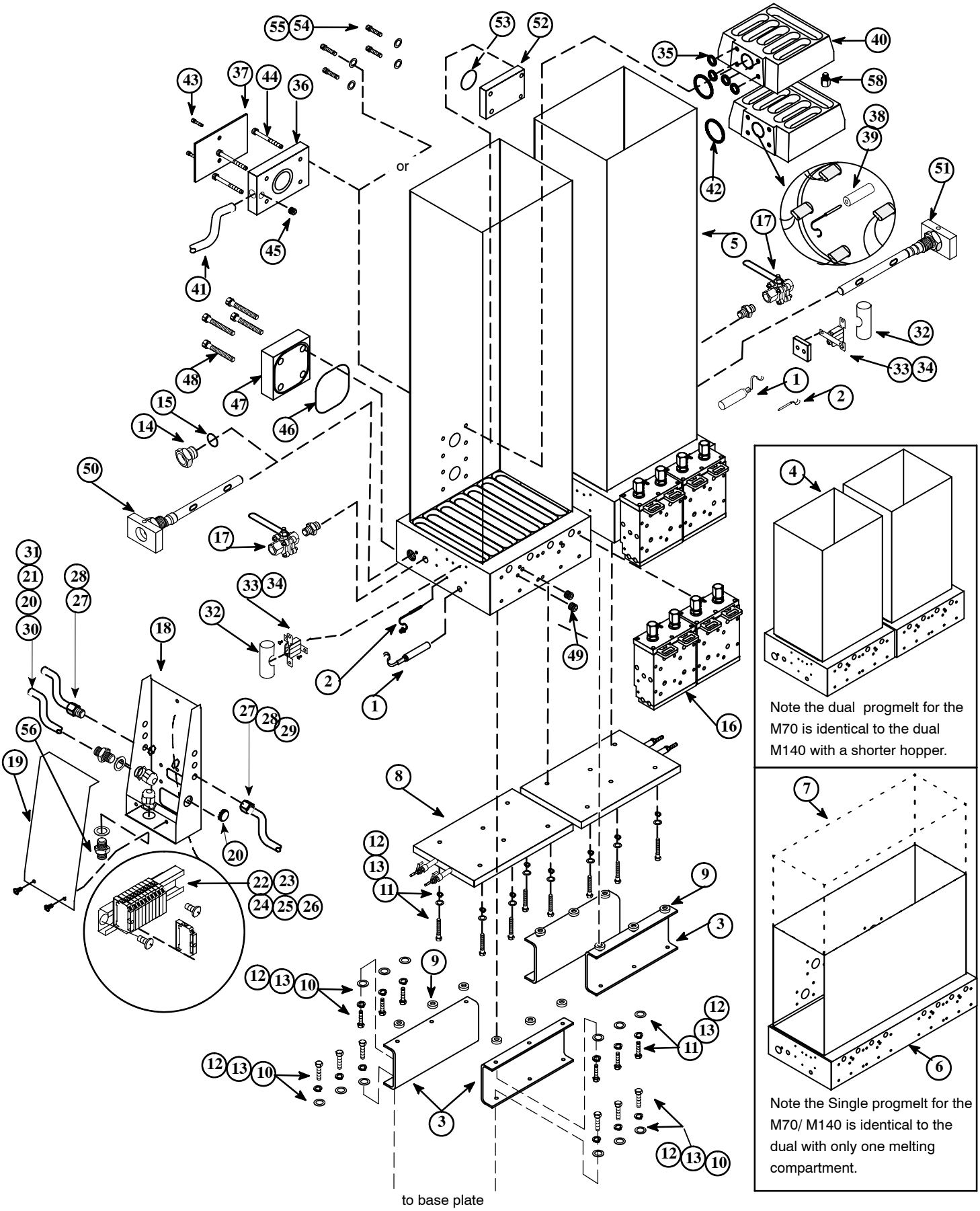
Item No.	Part Number	Description	Qty.
1	106874	Coupling Half, Pump Side (Option, not part of this assembly)	1
2	106875	Coupling Center (Option, not part of this assembly)	1
		Drive Assembly, M70/ M140/ M210	**1**
3	104663	M6'-1,0 x 25mm	4
4	106714	Coupling, Half, Motor Side	1
5	106658	Shaft, Gearbox, 20:1 (Front Drive Assembly 106660)	1
	108018	Shaft, Gearbox, 20:1 (Front Drive Assem. 106660,4.5cc pump)	1
	106661	Shaft (Rear Drive Assembly 106663)	
6	106662	Gear Box, 20:1	1
7	109226	Key, 1/4 Sq. x.75	3
8	106754	Ring Clip	2
9	106659	Motor Mounting Bracket	1
10	107602	Bolt M8 x 40mm HHC, Ser Fl, Screw	2
11	105060	Nut	2
12	801679	Motor, AC, 3P, 240v, 1HP, K256	
13	106324	Flat Washer, M6	8
14	106319	External Tooth Lock Washer, M6	4
15	N00732	5/16-18 x 3/4 SHC Screw	8
16	N00933	5/16 Lock Washer	8
17	N00687	5/16 Flat Washer	8
18	106342	Adapter Plate	1
19	078A183	3/8-16 x 1 HHC Screw'	4
20	106341	M8-1.25 x 40mm SH Set Screw	4
21	**808916**	**Optional Pneumatic Clutch Assembly**	**1**
22	030A014	Solenoid, 120V, 3-way	1
23	048J184	Cord Grip, 1/8 -1/4	1
24	072X004	1/8 Hex Nipple	1
25	106877	Clutch Kit, 56C, In line	1
26	N00099	Fitting, Elbow, 90deg., Brass	1
27	N02745	Muffler, Pneumatic Exhaust, 1/8 NPT	1
28	N07677	Tubing, TFE, .25 OD x .125 ID	4'
29	N08236	cable, 18ga, 3C, SV	10'
30	110504	**Optional Clutch Air Manifold Assembly**	**1**
31	110503	Air manifold	1
32	N00093	Fitting, 1/4 tube x 1/8 NPT	7
33	N00753	1/8 NPT Level Seal Plug	1
34	101692	M4-0.7 x 35mm SHC Screw	4
35	106198	Lockwasher, 4mm	4



Component Illustration: DYNAMELT AC Drive Assembly 106660 &106663

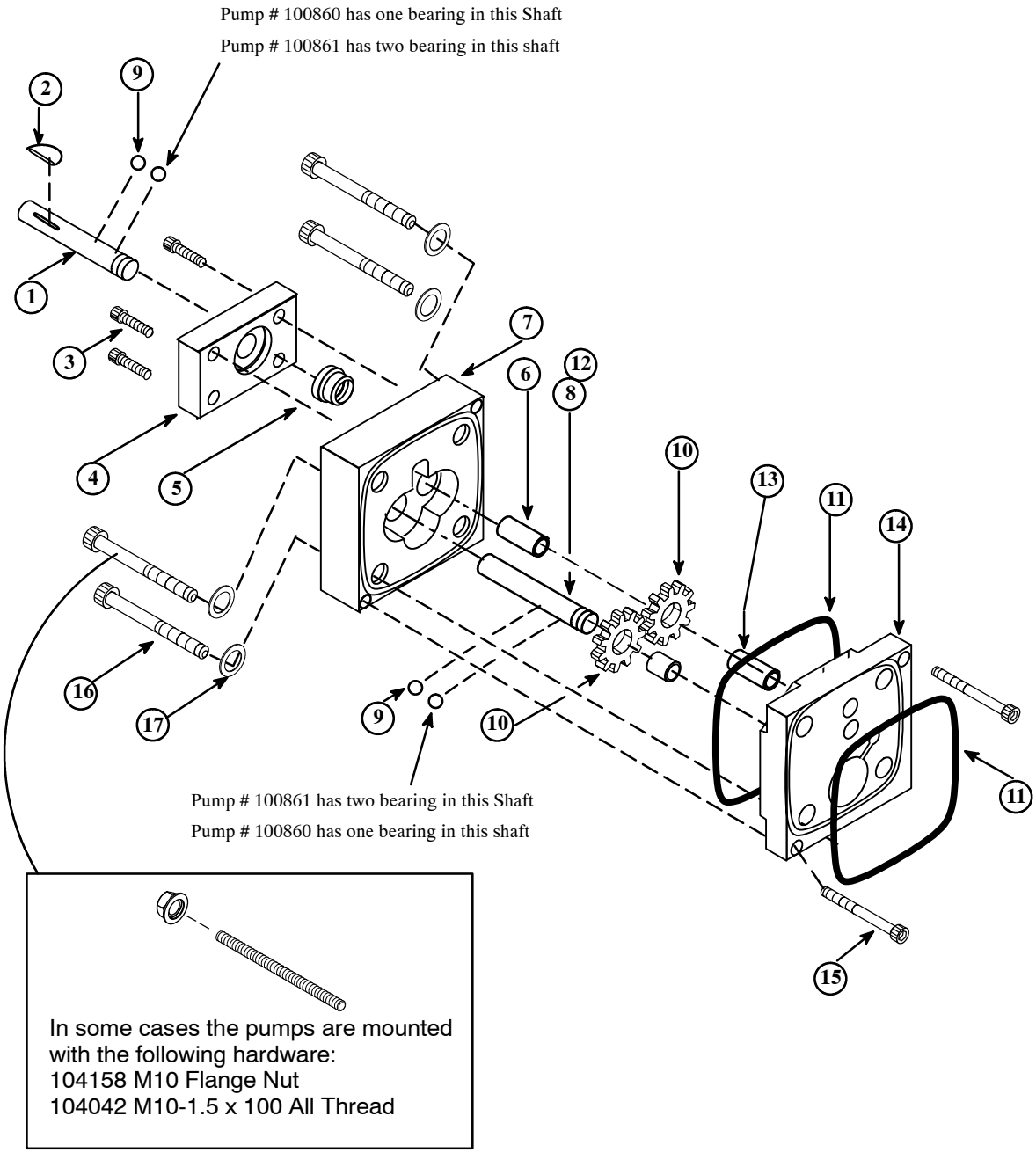
Single 106040, M140 Single High Flow 106694 and M140 Dual 106039 Melt & Grid Assemblies.

Item No.	Part Number	Description	Qty.
1	036B015	Pump Enable Thermostat	2
2	N07958	Temperature Sensor	4
3	105999	Hopper Support	4
4	105883	Hopper, Weldment, Dual, M70 (106037)	2
5	105884	Hopper, Weldment, Dual, M140 (106039)	2
6	105889	Hopper, Weldment, M70, Single (106038)	1
7	105890	Hopper, Weldment, M140, Single (106040)	1
	106620	Hopper, Weldment, M140, Single, High Flow (106694)	1
8	105881	Heater Plate, M70/ 140	2
9	105135	Spacer	12
10	108297	M8 x-1.25 x 20mm HHC Screw	12
11	107602	M8 x 40 HHC Screw	24
12	N00686	Flat Washers, 1/4	48
13	N00697	Lock Washer, 1/4	48
14	072X093	Filter Shut-off plug (fits in place of or opposite Filter shut-off)	2-4
15	N00210	O-ring, -912 (fits in place of or opposite Filter shut-off)	2-4
16		Filter Block Assembly (See Your order for part Number and Qty.)	
17	**106103**	**Ball Valve Assembly (Option)**	2
		Junction Box Assembly	**2**
18	105885	Junction Box, Prog-Melt, M70/ 140	1
19	106001	Cover, Junction Box,	1
20	078C021	Flat Washer, .88X1.0X.13	2
21	048J018	Bushing, Plastic Cap, 1/2"	2
22	048F125	Terminal Rail, 11.5" (one of each)	2
23	048F136	Block, Terminal 35 Amp	44
24	048F137	Cover End	6
25	048F021	Ground Terminal	2
26	048F069	End Clamp	2
27	107751	5/16 Conduit Fitting	4
28	N06883	Jam Nut	6
29	107645/ 107646	5/16 Conduit, 12 /25" (one for each conduit fitting)	2
30	048J088	1/2" Sealtite Connector	2
31	108829/ 108830	1/2"Sealtite Conduit, 36" / 1/2"Sealtite Conduit, 40" (opposite side)	1ea
	104166	**Over Temp. Switch Assembly (Sold as an assembly only)**	2
32	104165	Insulator, Over Temp Thermostat	2
33	104164	Overtemp Reset Thermostat	2
34	103538	M4 X 6mm Pan Head	2
		Grid Group	**2**
35	N00181	O-ring, -014	8-16
	N007081	O-ring, (-014 Kalrez)	8-16
36	104696	Flange	2
37	003E023	Cover	1
38	N07958	Temperature Sensor	2
39	106174	Sensor Adapter	2
40	104802	Cast Heater	2
41	048J048	1/4 ID Conduit	4'
42	NN00192	O-ring, -032	2-4
	069X285	O-ring, -032 (kalrez)	2-4
43	102446	M4-0. 70 x 10mm SHC Screw	4
44	N07429	M8-1.25 x 35mm SHC Screw	8
45	078A055	10-24 x 3/16 SHS Screw	2
	084Q465	**Pump Block-off Assembly (option)**	
46	069X064	O-ring, #-041	1
47	012G009	Block-off Plate	1
48	N00834	3/8-16 x 1.25 SHC Screw	4
49	N00754	1/4 Level Seal Plug	2
50	**105967**	**Filter Shutoff Assembly (Left)**	**1**
	105968	**Filter Shutoff Assembly (Right)**	**1**
51	**804464**	**Filter Shutoff Assembly (Left) (HI-Temp Option)**	**1**
	804465	**Filter Shutoff Assembly (Right) (HI-Temp Option)**	**1**
	805216	**Grid Block Off Assembly**	**1-2**
52	105149	Block off Plate	1
53	N00192	O-ring, #-032	1
54	108297	M8 x 20mm HHC Flange Screw	4
55	N00181	O-ring, -#014	4
56	105097	M6 x 30mm SH Set Screw	2
57	069X274	Seal Dual Pump to Prog melt (not Shown)	4
58	811278	Grid Support	As needed


or
to base plate
Note the dual progmelt for the M70 is identical to the dual M140 with a shorter hopper.
Note the Single progmelt for the M70/ M140 is identical to the dual with only one melting compartment.

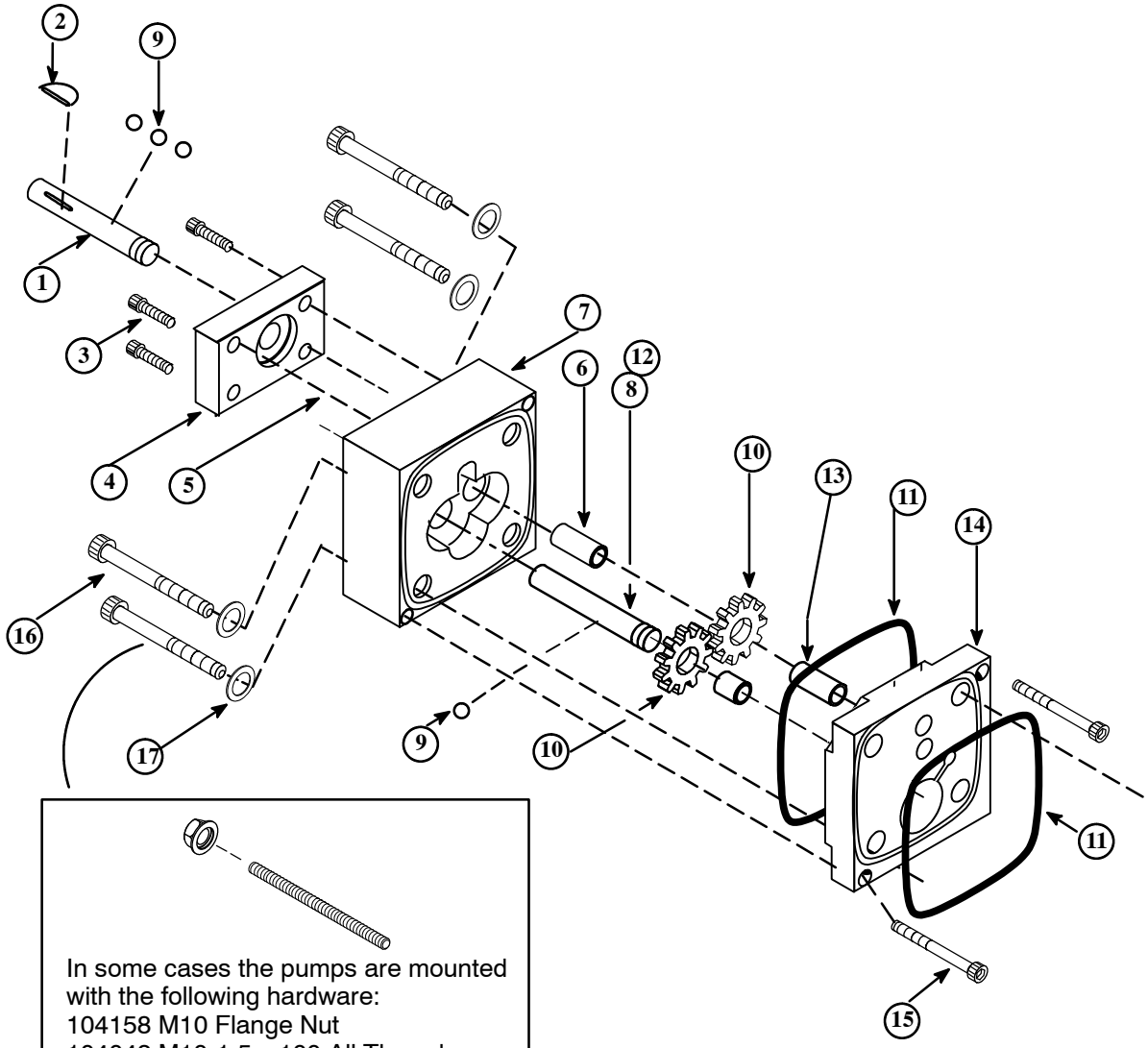
Bill of Materials for 1.54 cc / Rev. , Single Gear Pump Assembly # 100860
Bill of Materials for 3.2 cc / Rev. , Single Gear Pump Assembly # 100861

Item No.	Part Number #100860 / #100861	Description	Qty.
1	012D079 / 012D077	Drive Shaft	1
2	078I001	Key, Woodruff	1
3	101626	M5 x 12 SHC Screw	4
4	069X160	Seal Retainer & Bearing Housing	1
5	069X061	Lip Seal	1
6	018X041	Bearing Sleeve	2
7	100866 / 100867	Front Plate Assembly	1
8	012D080 / 012D078	Driven Gear Shaft	1
9	018X031	Ball, 1/8" Diameter (See illustration for quantity)	2-4
10	012C020 / 012C019	Drive Gear, 1.54 cc/rev	2
11	069X064	Pump Seal	2
12	078F017	Shaft Retaining Ring	4
13	018X041	Bearing Sleeve, Rear Plate	2
14	100865	Rear Plate Assembly	1
15	100908	M4 x 25 SHC Screw	2
16	104775/ 104776	M10-1.5 x 75mm/ 80mm	4
17	NPN	M10 Flat Washer	4


Pump # 100860 has one bearing in this Shaft
Pump # 100861 has two bearing in this shaft
Pump # 100861 has two bearing in this Shaft
Pump # 100860 has one bearing in this shaft
In some cases the pumps are mounted with the following hardware:
104158 M10 Flange Nut
104042 M10-1.5 x 100 All Thread

Bill of Materials for 4.50 cc / Rev. , Single Gear Pump Assembly # 100862

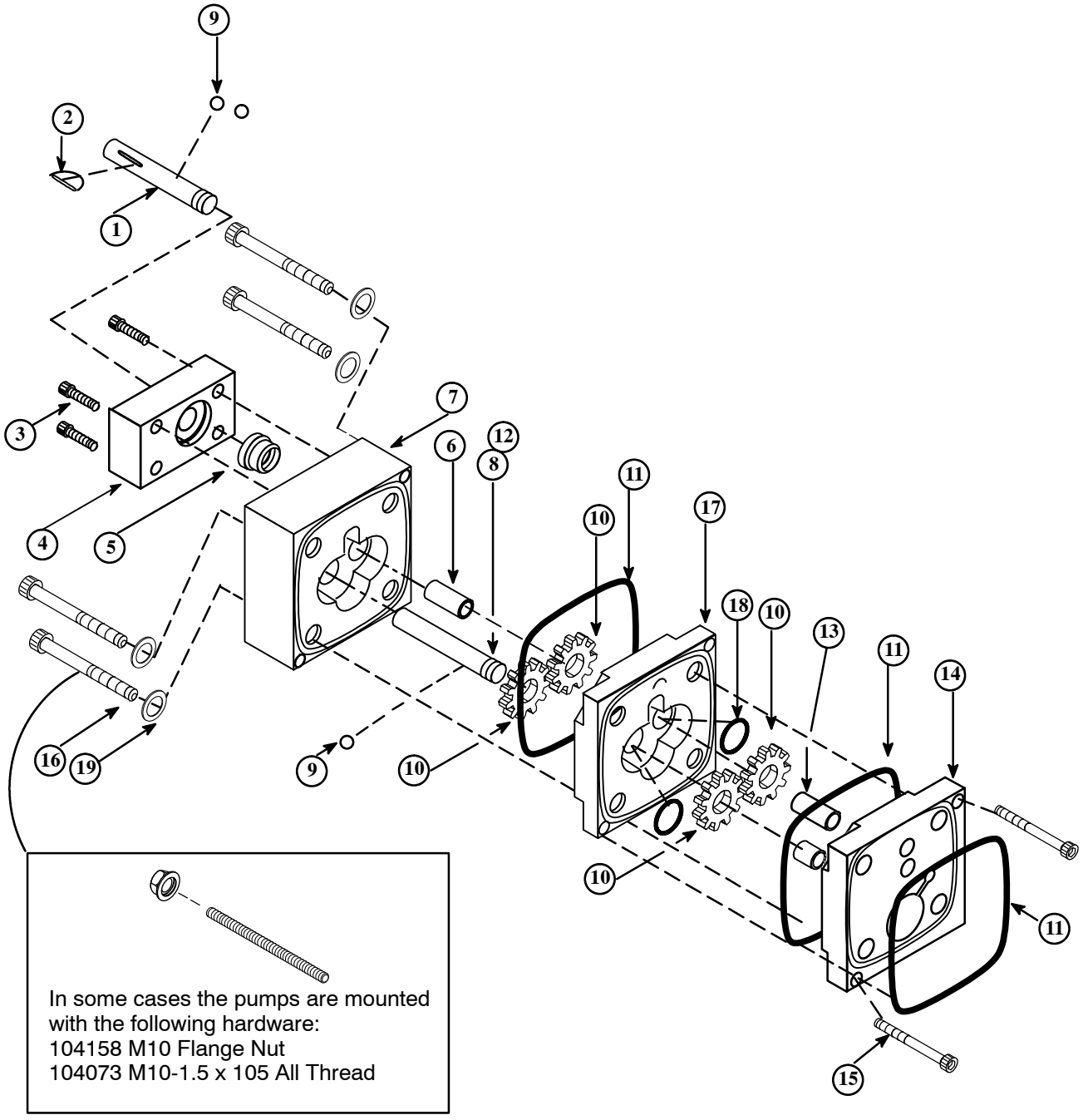
Item No.	Part Number	Description	Qty.
1	012D072	Drive Shaft	1
2	078I001	Key, Woodruff	1
3	101626	M5 x 12 SHC Screw	4
4	069X160	Seal Retainer & Bearing Housing	1
5	069X061	Lip Seal	1
6	018X041	Bearing Sleeve	2
7	100868	Front Plate Assembly	1
8	012D073	Driven Gear Shaft	1
9	018X031	Ball, 1/8" Diameter	4
10	012C018	Drive Gear, 4.5 cc/rev	2
11	069X064	Pump Seal	2
12	078F017	Shaft Retaining Ring	4
13	018X041	Bearing Sleeve, Rear Plate	2
14	100865	Rear Plate Assembly	1
15	100908	M4 x 25 SHC Screw	2
16	104776	M10-1.5 x 80mm	4
17	NPN	M10 Flat washer	4



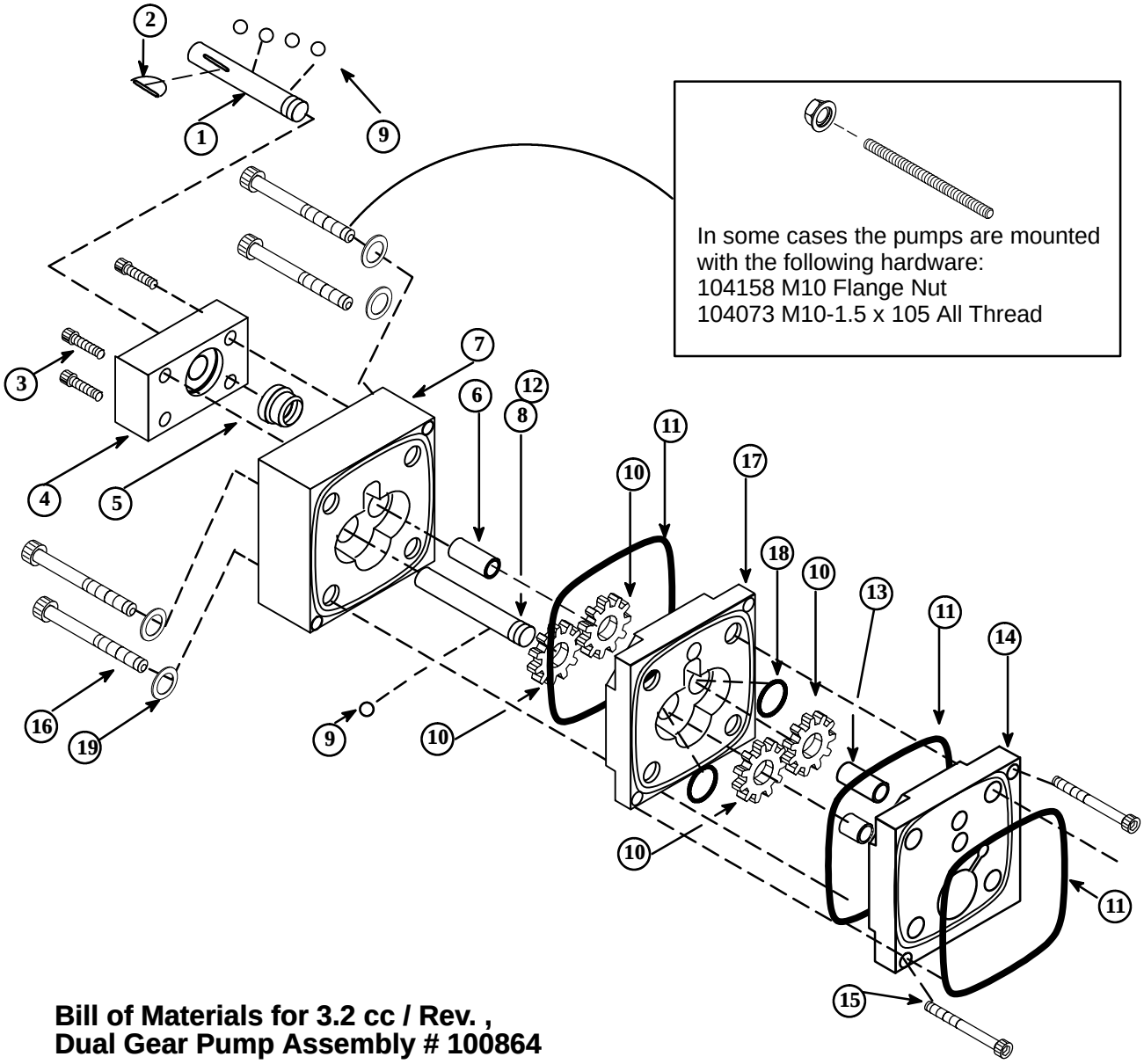
In some cases the pumps are mounted with the following hardware:
104158 M10 Flange Nut
104042 M10-1.5 x 100 All Thread

Bill of Materials for 1.54 cc / Rev. , Dual Gear Pump Assembly # 100863

Item No.	Part Number	Description	Qty.
1	012D083	Drive Shaft	1
2	078I001	Key, Woodruff	1
3	101626	M5 x 12 SHCS	4
4	069X160	Seal retainer & Bearing Housing	1
5	069X061	Lip Seal	1
6	018X041	Bearing Sleeve	2
7	100866	Front Plate Assembly	1
8	012D082	Driven Gear Shaft	1
9	018X031	Ball, 1/8" Dia.	3
10	012C020	Pump Gear, 1.5 cc/Rev	4
11	069X064	O-ring, -041	3
12	078F017	Shaft Retaining Ring	4
13	018X041	Bearing Sleeve, rear Plate	2
14	100865	Rear Plate Assembly	1
15	101692	M4 x 35 SHCS	2
16	NPN	M10-1.5 x 85mm SHC Screw	4
17	100869	Middle Plate	1
18	N00198	O-ring, -113	2
19	NPN	M10 Flat Washer	4

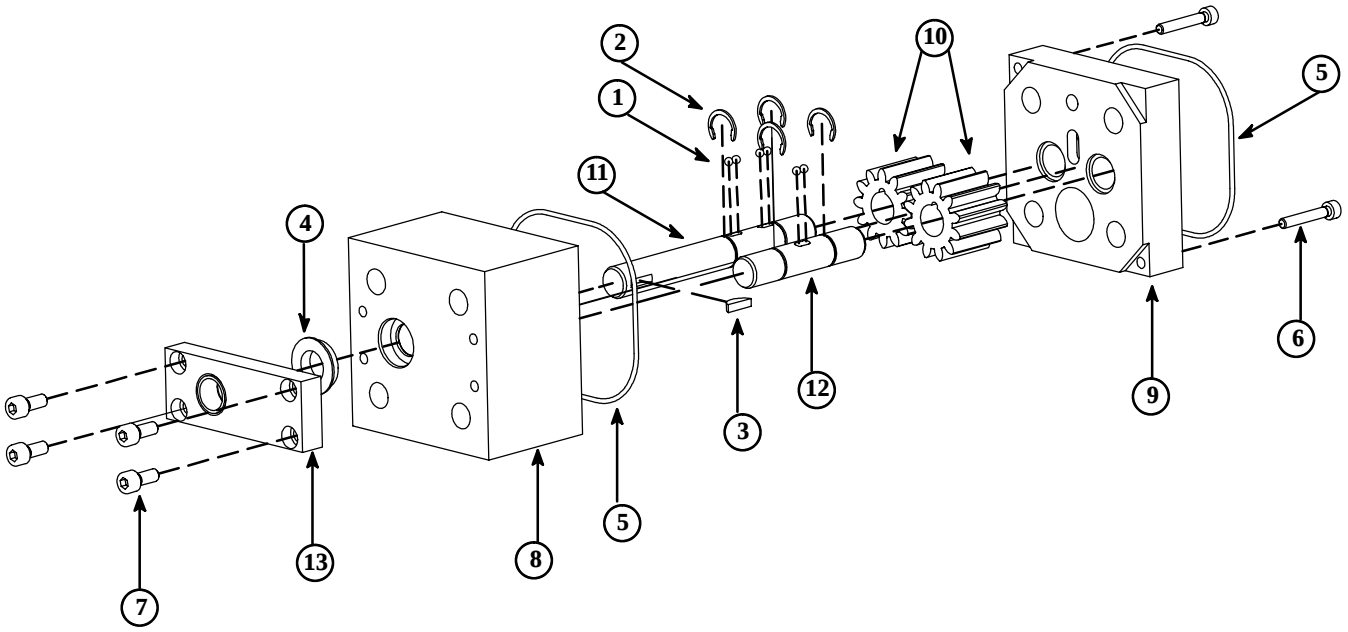


Component Illustration: 1.54 cc / Rev, Dual Gear Pump Assembly #100863



Bill of Materials for 3.2 cc / Rev. , Dual Gear Pump Assembly # 100864

Item No.	Part Number	Description	Qty.
1	012D088	Drive Shaft	1
2	078I001	Key, Woodruff	1
3	101626	M5 x 12 SHCS	4
4	069X160	Seal retainer & Bearing Housing	1
5	069X061	Lip Seal	1
6	018X041	Bearing Sleeve	2
7	100867	Front Plate Assembly	1
8	012D087	Driven Gear Shaft	1
9	018X031	Ball, 1/8” Dia.	5
10	012C019	Drive Gear, 4.5 cc/Rev	4
11	069X064	O-ring, -041	3
12	078F017	Shaft Retaining Ring	4
13	018X041	Bearing Sleeve, rear Plate	2
14	100865	Rear Plate Assembly	1
15	101691	M4 x 40 SHCS	2
16	NPN	M10-1.5 x 85mm	4
17	100870	Middle Plate	1
18	N00198	O-ring, -113	2
19	NPN	M10 Flat Washer	4



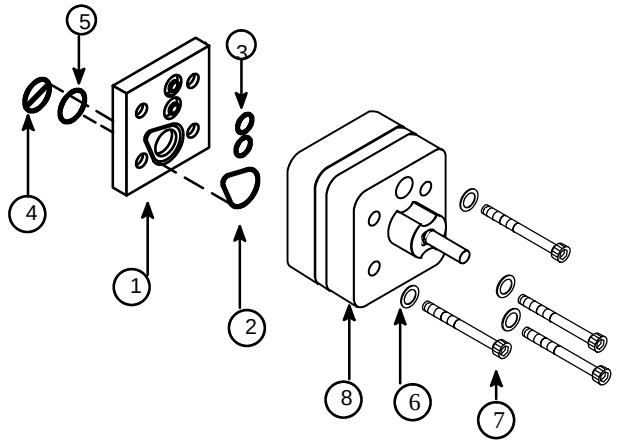
Bill of Materials for 10cc Single Gear Pump Assembly # 109690

Item No.	*Part Number*	*Description*	*Qty.*
1	018X031	Ball bearing, 1/8 Dia.	6
2	078F017	Snap ring, 1/2"	4
3	078I001	Key Woodruf, #404	1
4	069X061	Shaft Seal	1
5	069X064	O-ring, -041	2
6	100908	M4-0.7 x 25mm SHC Screw	2
7	101626	M5-0.8 x 12mm SHC Screw	4
8	109685	Pump Body10cc Rev	1
9	109686	Rear Bearing Plate 10cc Rev.	1
10	109689	Gear 10cc Rev	2
11	109687	Drive Shaft 10cc/ 20cc	1
12	109688	Driven shaft, 10cc/20cc	1
13	069X160	Shaft seal retainer	1
14	001U002	Dow Corning 112 Lubricant (Not Shown)	

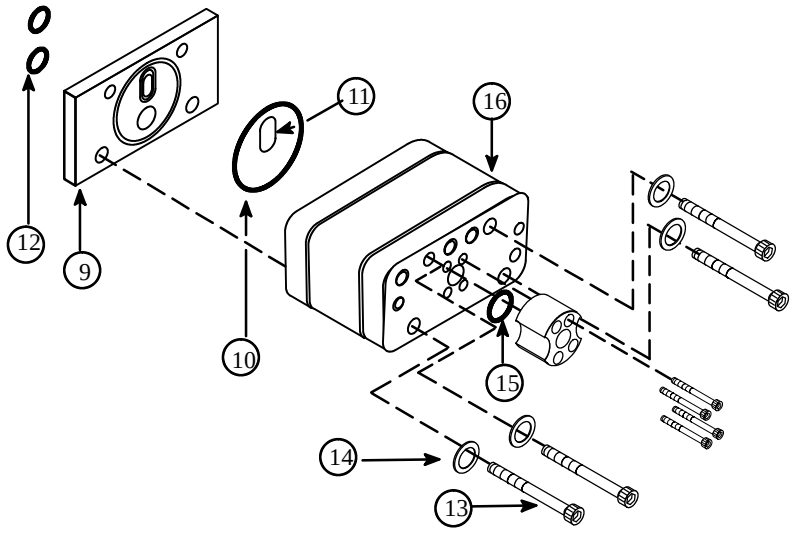
Bill of Materials for Assorted Pump Adapter Assemblies

Item No.	Part Number	Description	Qty.
	084E406	**TSHA Pump Adapter Assembly**	**1**
1	012G024	Pump Adapter	1
2	069X058	O–Ring #28	1
3	N00179	O–Ring #12	2
4	069X274	Seal Dual Pump to Progmelt (not part of this assembly)	1
5	N00190	O-Ring #24	1
6	078C130	3/8 Washer, 3/4 OD	4
7	NPN	M10 x 85mm SHC screw	4
8		Zenith Pump	
	084E428	THSA .297 cc Single Outlet	
	084E374	THSA .584 cc Single Outlet	
	084E430	THSA 1.168 cc Single Outlet	
	084E434	THSA 2.292 cc Single Outlet	
	108875	THSA 8.5 cc Single Outlet	
	084E438	THSA 30.0 cc Single Outlet	
	084E389	THSA .584 cc Dual Outlet	
	084E432	THSA 1.168 cc Dual Outlet	
	108874	THSA 2.292 cc Dual Outlet	
	084E419	**Zenith Pump Adapter Assembly**	**1**
9	012G027	Adapter, Z Pump	1
10	069X064	O-Ring, #041	1
11	069X230	O-Ring, #021	1
12	069X270	O-Ring, #025	2
13	078A618	Screw, Pump Mounting	4
14	078C141	7/16 ss Washer, 3/4 OD	4
15	069X289	Drive Shaft Seal	1
16		THSA Pump	
	084E411	THSA 20 cc Single Outlet	
	084E412	THSA 30 cc Single Outlet	
	084E413	THSA 45 cc Single Outlet	
	103923	**Feinpruef Pump Adapter Assembly**	**1**
17	103624	Adapter Plate	1
18	103924	O-ring Plate	1
19	N00181	O-ring, -014	4
20	069X270	O-ring-025	1
21	102927	O-ring, -133	1
22		Feinpruef Pump	
	103917	Feinpruef Pump .3 cc	
	103918	Feinpruef Pump 1.2 cc	
	103919	Feinpruef Pump 2.4 cc	
	104351	Coupling Half (Not Shown, See drive Section)	

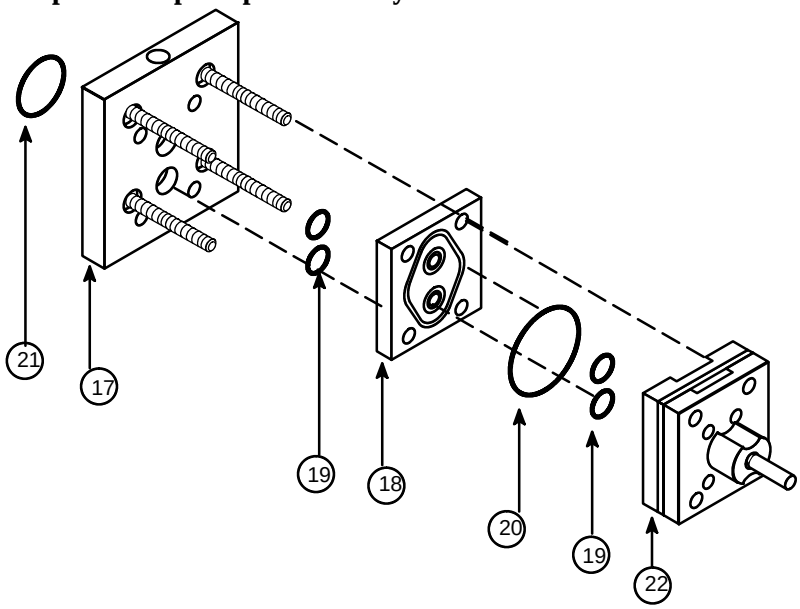
THSA Pump Adapter Assembly 084E406

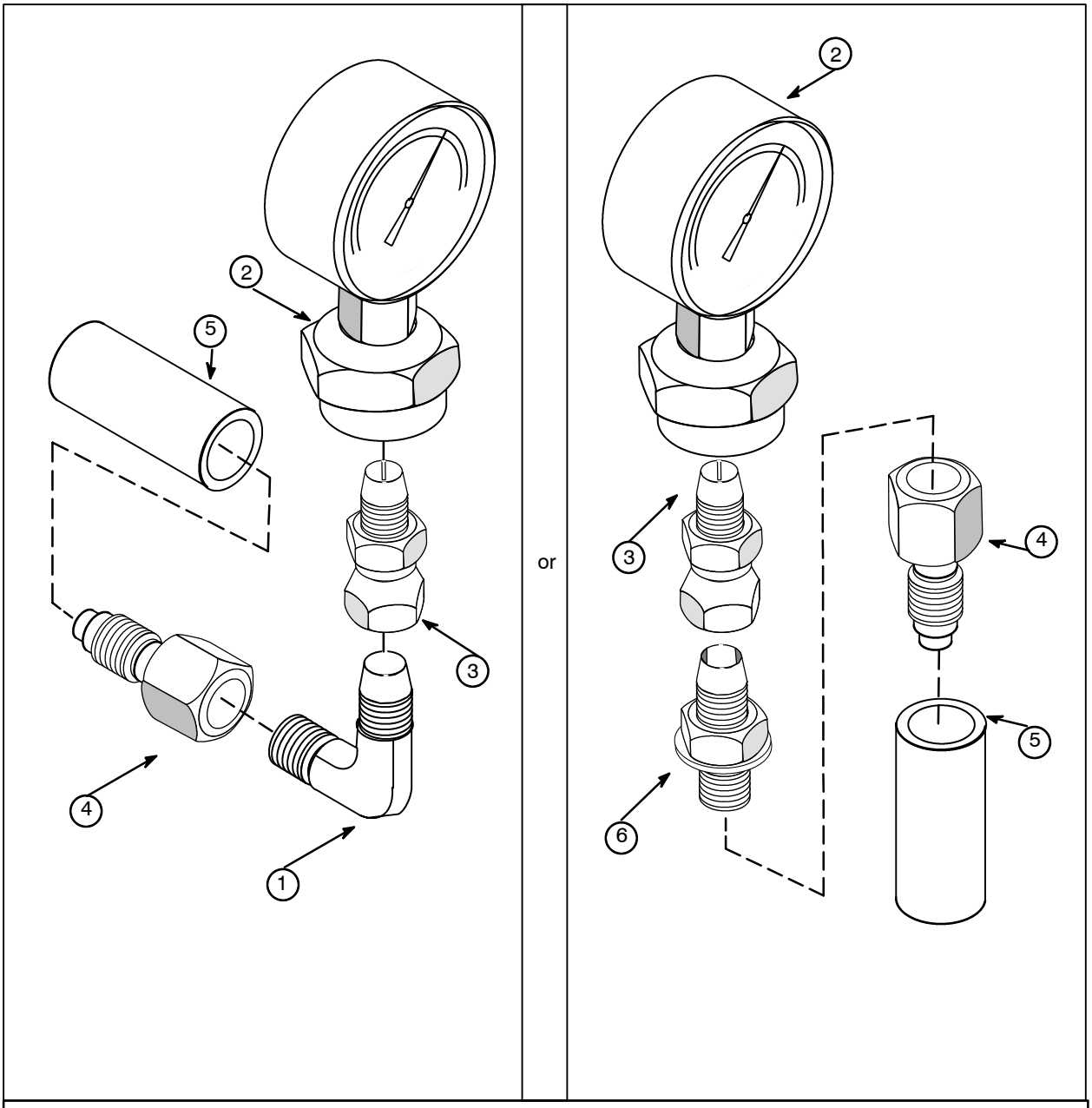


THSA Pump Adapter Assembly 084E419



Feinpruef Pump Adapter Assembly 103923



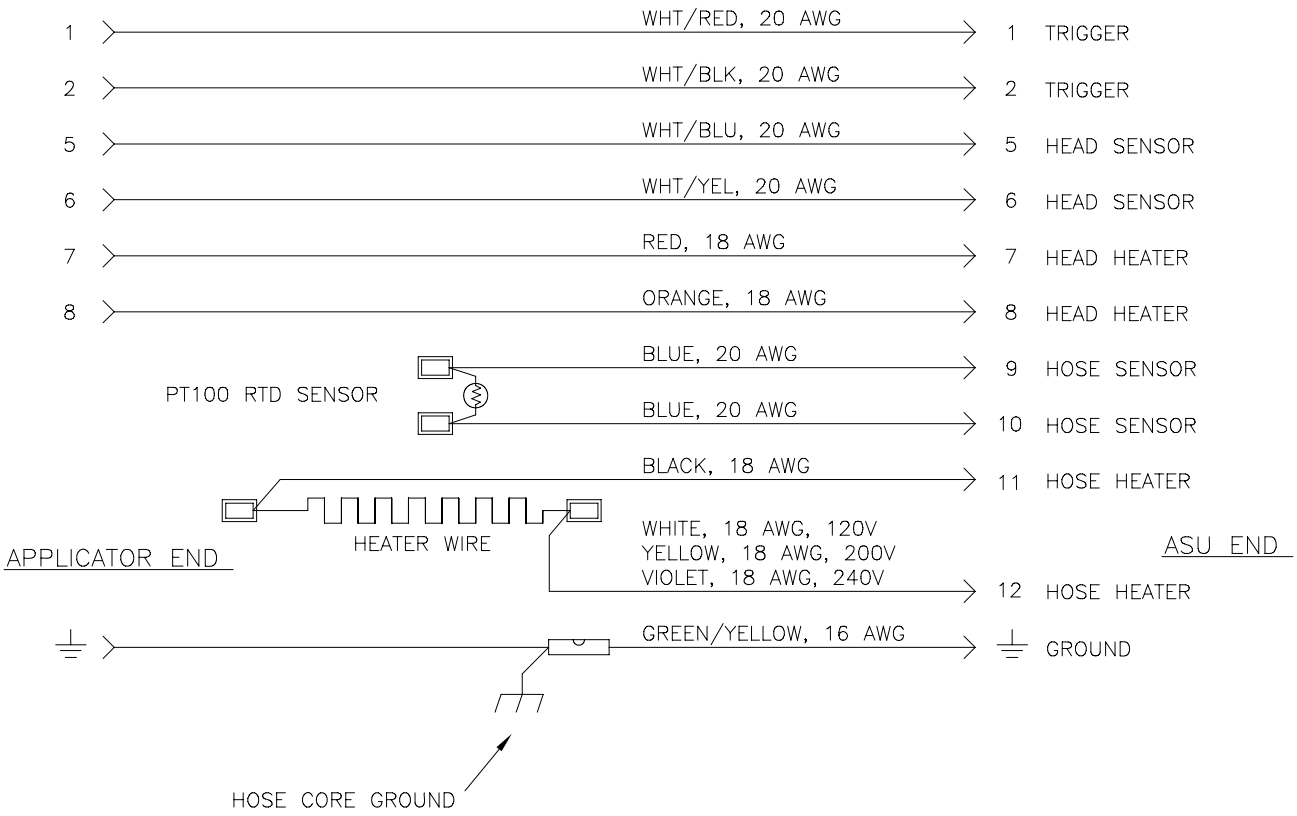


Pressure Gauge Assembly-805641

Item No.	Part Number	Description	Qty.
1	806883	Fitting, 1/4 NPTM x #6 JIC x 90	1
2	101174	Pressure Guage, 1000 PSI	1
3	104325	Fitting Adapter, Swivel, 6J x 1/4 MPT	1
4	805632	Fitting, 1/4 NPT 1/2-20 Tranducer	1
5	102987	Insulator	1
6	N00104	Fitting, 1/4 NPTM x #6, ST	1

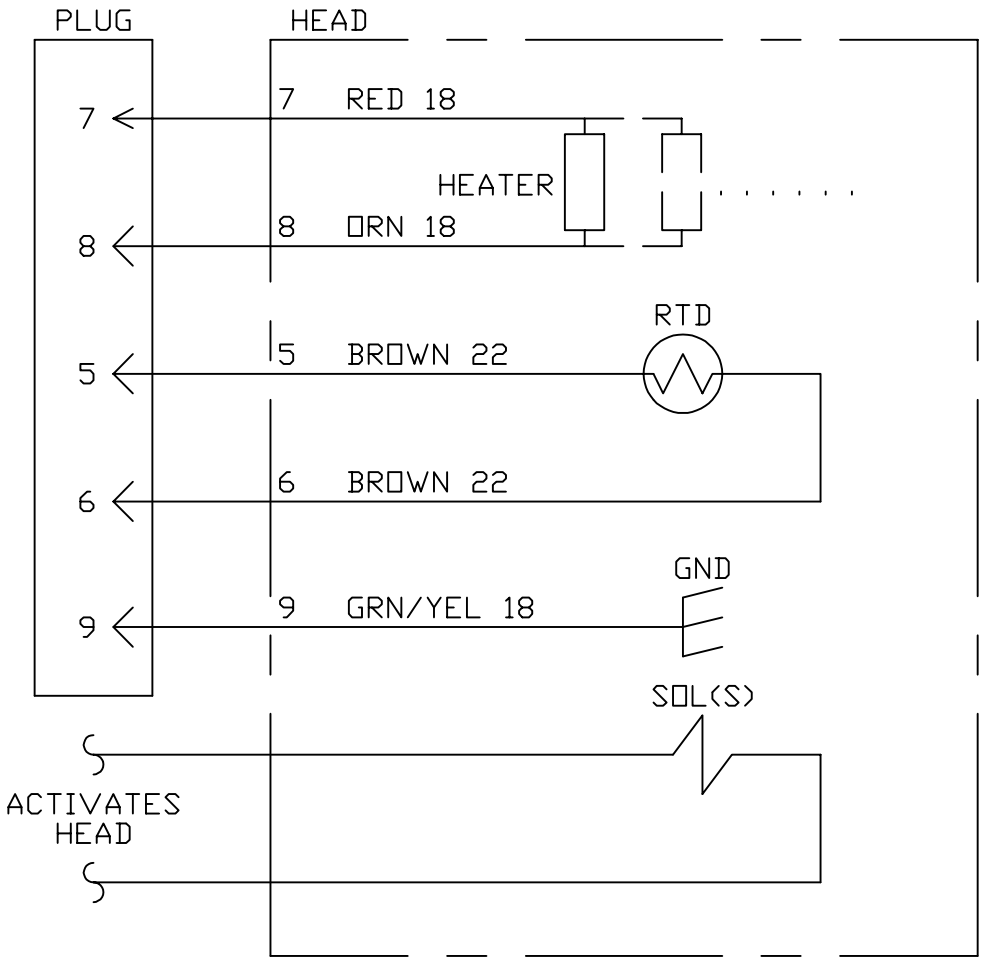
Chapter 11
SCHEMATICS & ENGINEERING DRAWINGS

Drawing:	***Found on:***
Hose Schematic, ASU to Applicator	page 11-2
Applicator Head Schematic	page 11-3
Flow Diagram, Outlet Filter Manifold	page 11-4
Typical Hydraulic Schematic	page 11-5
Grounding Diagram, CE Mark	Page 11-6
Pump & Zone Configuration	Page 11-7
ASU Schematics	end of chapter



NOTES:

1. ALL WIRING IS ROUTED THROUGH THE HOSE.,
2. WIRE SIZES SHOWN ARE FOR NO. 6 AND NO. 8 HOSES UP TO 24 FT. IN LENGTH. FOR LARGER DIAMETER AND LONGER HOSES, HEATER LEAD WIRES ARE 16 AWG. OTHER WIRE SIZES, AND COLORS, MAY BE CHANGED IN SPECIAL HOSES, PER CUSTOMER REQUEST.



HEAD SCHEMATIC PN 103117 REV. B

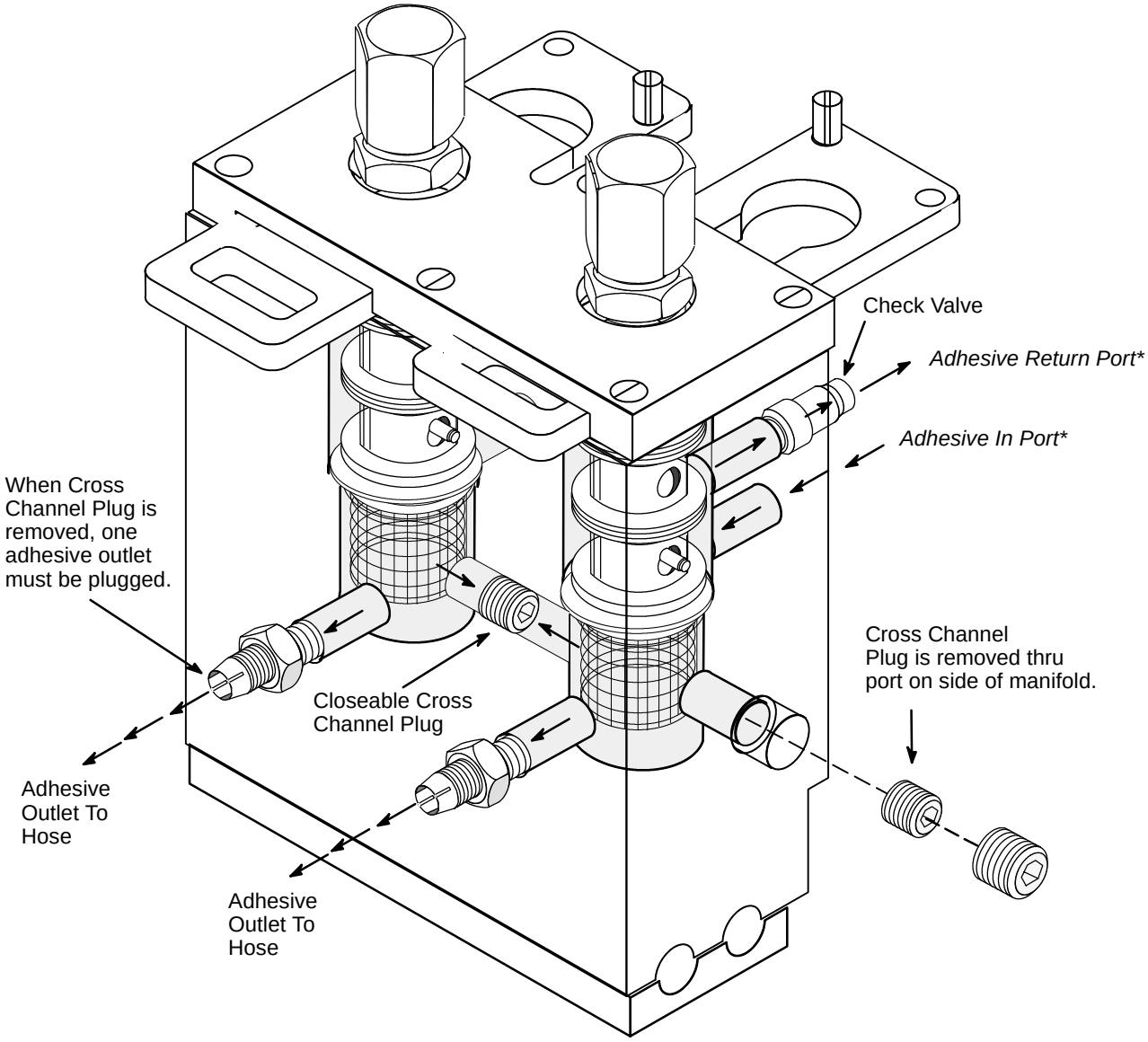
HEAD SCHEMATIC PN 103117 REV. B

Function of Outlet Filter Manifold's Closeable Cross Channel

A Closeable Cross Channel Plug is located inside the Outlet Filter Manifold to prevent adhesive flow between the two outlet filters when a dual pump is in use.

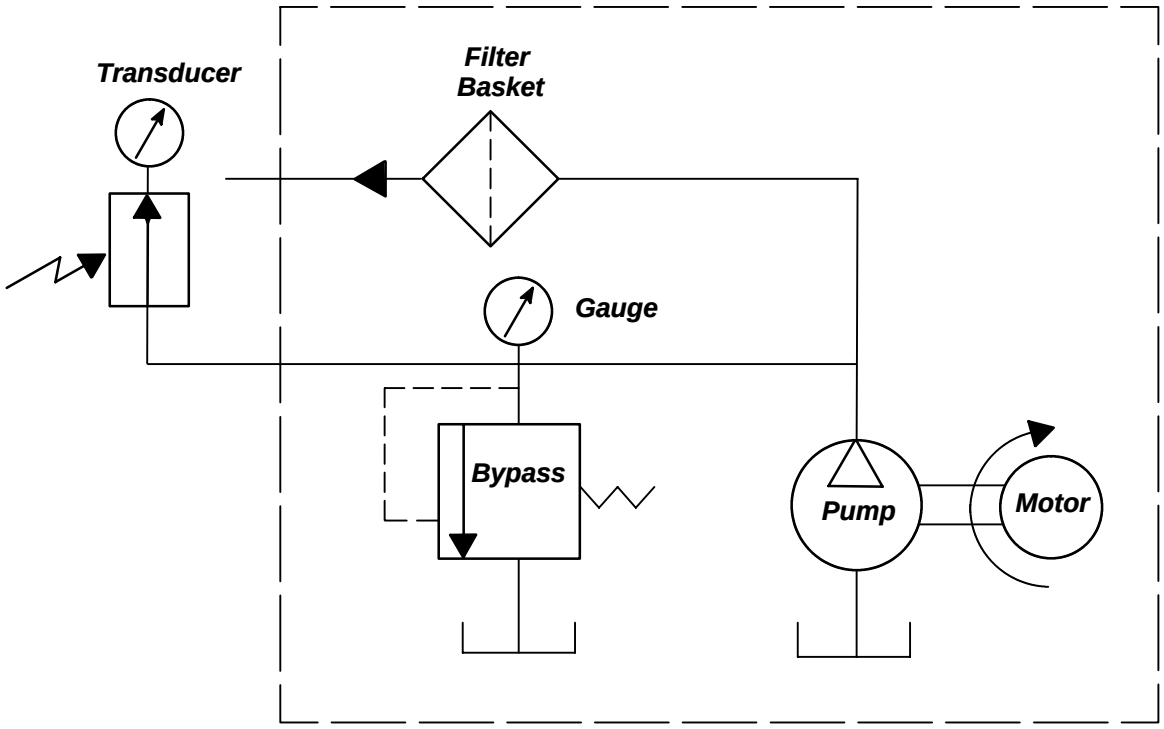
When a single pump is used, ITW Dynatec removes the Cross Channel Plug.

When changing an ASU from a single to a dual pump, or vice versa, consult ITW Dynatec for complete instructions.


Check Valve
Adhesive Return Port*
Adhesive In Port*
When Cross Channel Plug is removed, one adhesive outlet must be plugged.
Cross Channel Plug is removed thru port on side of manifold.
Closeable Cross Channel Plug
Adhesive Outlet To Hose
Adhesive Outlet To Hose

FLOW DIAGRAM, OUTLET FILTER MANIFOLD

** The second Adhesive In and Adhesive Return ports are not shown.*



TYPICAL HYDRAULIC SCHEMATIC: Single Pump, Motor, Bypass, Filter, optional Transducer & optional Pressure Gauge

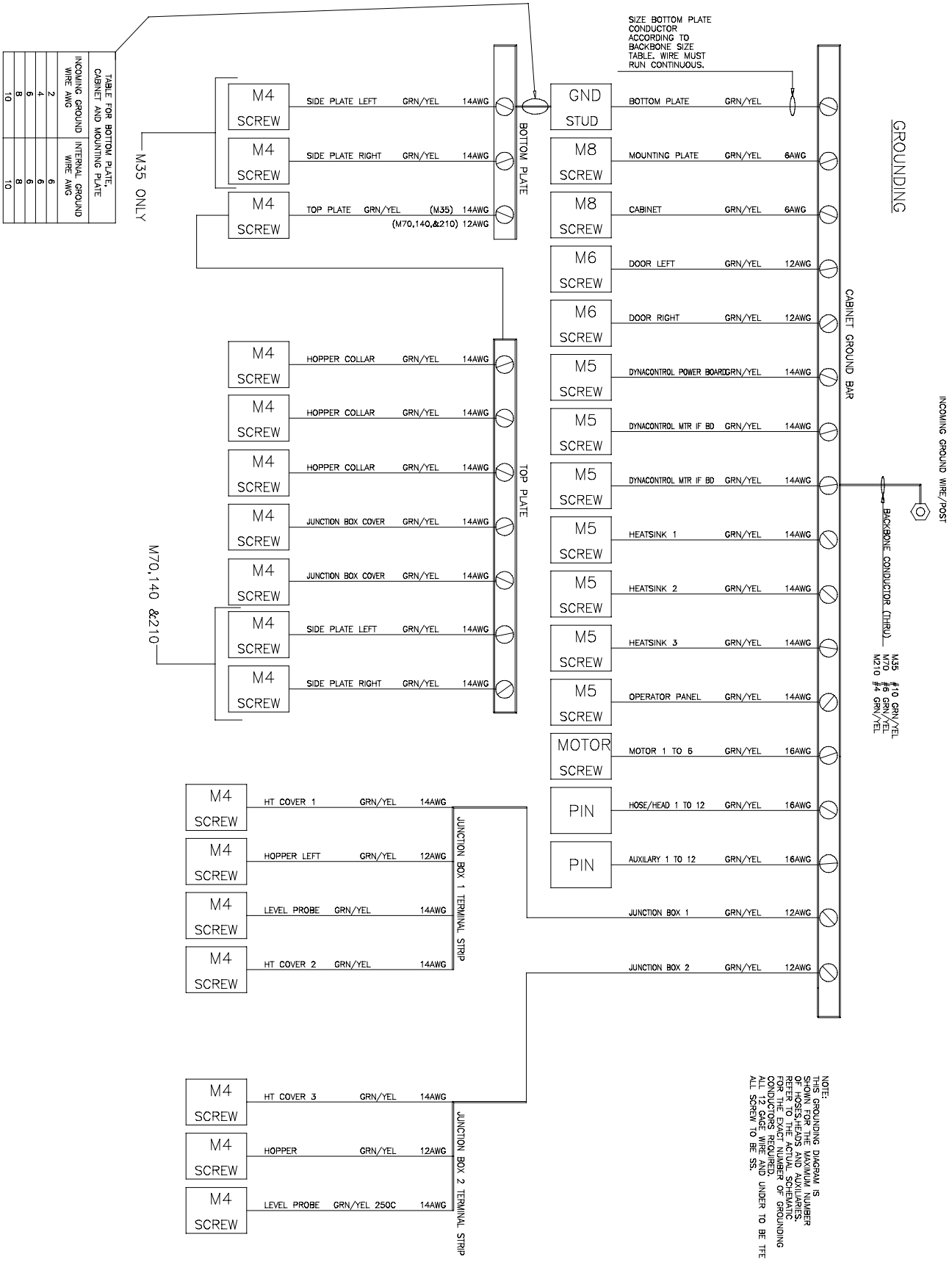


TABLE FOR BOTTOM PLATE, CABINET AND MOUNTING PLATE
INCOMING GROUND WIRE AWG
INTERNAL GROUND WIRE AWG
10 8
8 8
6 6
4 6
2 6
M35 ONLY
M70,140 &210
M4 SCREW
SIDE PLATE LEFT GRN/YEL 14AWG
SIDE PLATE RIGHT GRN/YEL 14AWG
TOP PLATE GRN/YEL (M35) 14AWG
(M70,140,&210) 12AWG
BOTTOM PLATE
TOP PLATE
HOPPER COLLAR GRN/YEL 14AWG
JUNCTION BOX COVER GRN/YEL 14AWG
SIDE PLATE LEFT GRN/YEL 14AWG
SIDE PLATE RIGHT GRN/YEL 14AWG
SIZE BOTTOM PLATE CONDUCTOR ACCORDING TO BACKBONE SIZE TABLE. WIRE MUST RUN CONTINUOUS.
GND STUD
BOTTOM PLATE GRN/YEL
M8 SCREW
MOUNTING PLATE GRN/YEL 6AWG
CABINET GRN/YEL 6AWG
M6 SCREW
DOOR LEFT GRN/YEL 12AWG
DOOR RIGHT GRN/YEL 12AWG
M5 SCREW
DYNACONTROL POWER BOARD GRN/YEL 14AWG
DYNACONTROL MTR IF BD GRN/YEL 14AWG
DYNACONTROL MTR IF BD GRN/YEL 14AWG
HEATSINK 1 GRN/YEL 14AWG
HEATSINK 2 GRN/YEL 14AWG
HEATSINK 3 GRN/YEL 14AWG
OPERATOR PANEL GRN/YEL 14AWG
MOTOR SCREW
MOTOR 1 TO 6 GRN/YEL 16AWG
PIN
HOSE/HEAD 1 TO 12 GRN/YEL 16AWG
AUXILARY 1 TO 12 GRN/YEL 16AWG
CABINET GROUND BAR
GROUNDING
INCOMING GROUND WIRE/POST
BACKBONE CONDUCTOR (THRU)
M35 #10 GRN/YEL
M70 #6 GRN/YEL
M210 #4 GRN/YEL
HT COVER 1 GRN/YEL 14AWG
HOPPER LEFT GRN/YEL 12AWG
LEVEL PROBE GRN/YEL 14AWG
HT COVER 2 GRN/YEL 14AWG
JUNCTION BOX 1 TERMINAL STRIP
JUNCTION BOX 1 GRN/YEL 12AWG
JUNCTION BOX 2 GRN/YEL 12AWG
HT COVER 3 GRN/YEL 14AWG
HOPPER GRN/YEL 12AWG
LEVEL PROBE GRN/YEL 250C 14AWG
JUNCTION BOX 2 TERMINAL STRIP
NOTE:
THIS GROUNDING DIAGRAM IS SHOWN FOR THE MAXIMUM NUMBER OF HOSES-HEADS AND AUXILIARIES. REFER TO THE ACTUAL SCHEMATIC FOR THE EXACT NUMBER OF GROUNDING CONDUCTORS REQUIRED.
ALL 12 GAUGE WIRE AND UNDER TO BE TFE 260C.
ALL SCREW TO BE SS.

GROUNDING DIAGRAM, CE MARK, PN 804704 REV. E

Zone Configuration for Hose/Head/Aux.

M35

Hose	1	2
Head	2	3
Aux.	5	8
	6	9
	7	10

Hose	1	2	3	4
Head	5	8	11	14
Aux.	6	9	12	15
	7	10	13	16

M70/140

(2)

Hose	1	2
Head	2	3
Aux.	5	8
	6	9
	7	10

Hose	1	2	3	4
Head	5	8	11	14
Aux.	6	9	12	15
	7	10	13	16

(4)

Hose	1	2	3	4	5	6
Head	2	3	4	5	6	7
Aux.	5	8	11	14	21	24
	6	9	12	15	22	25
	7	10	13	16	23	26

(6)

Hose	1	2	3	4	5	6
Head	2	3	4	5	6	7
Aux.	5	8	11	14	21	24
	6	9	12	15	22	25
	7	10	13	16	23	26

(8)

Hose	1	2	3	4	5	6	7	8
Head	2	3	4	5	6	7	8	9
Aux.	5	8	11	14	21	24	27	30
	6	9	12	15	22	25	28	31
	7	10	13	16	23	26	29	32

M210

(2)

Hose	1	2
Head	2	3
Aux.	21	24
	22	25
	23	26

Hose	1	2	3	4
Head	2	3	4	5
Aux.	21	24	27	30
	22	25	28	31
	23	26	29	32

(4)

Hose	1	2	3	4	5	6
Head	2	3	4	5	6	7
Aux.	5	8	11	14	21	24
	6	9	12	15	22	25
	7	10	13	16	23	26

(6)

Hose	1	2	3	4	5	6
Head	2	3	4	5	6	7
Aux.	5	8	11	14	21	24
	6	9	12	15	22	25
	7	10	13	16	23	26

(8)

Hose	1	2	3	4	5	6	7	8
Head	2	3	4	5	6	7	8	9
Aux.	5	8	11	14	21	24	27	30
	6	9	12	15	22	25	28	31
	7	10	13	16	23	26	29	32

(10) (c)

Hose	1	2	3	4	5	6	7	8	9	10
Head	2	3	4	5	6	7	8	9	10	11
Aux.	5	8	11	14	21	24	27	30	37	40
	6	9	12	15	22	25	28	31	38	41
	7	10	13	16	23	26	29	32	39	42

(12) (c)

Hose	1	2	3	4	5	6	7	8	9	10	11	12
Head	2	3	4	5	6	7	8	9	10	11	12	13
Aux.	5	8	11	14	21	24	27	30	37	40	43	46
	6	9	12	15	22	25	28	31	38	41	44	47
	7	10	13	16	23	26	29	32	39	42	45	48

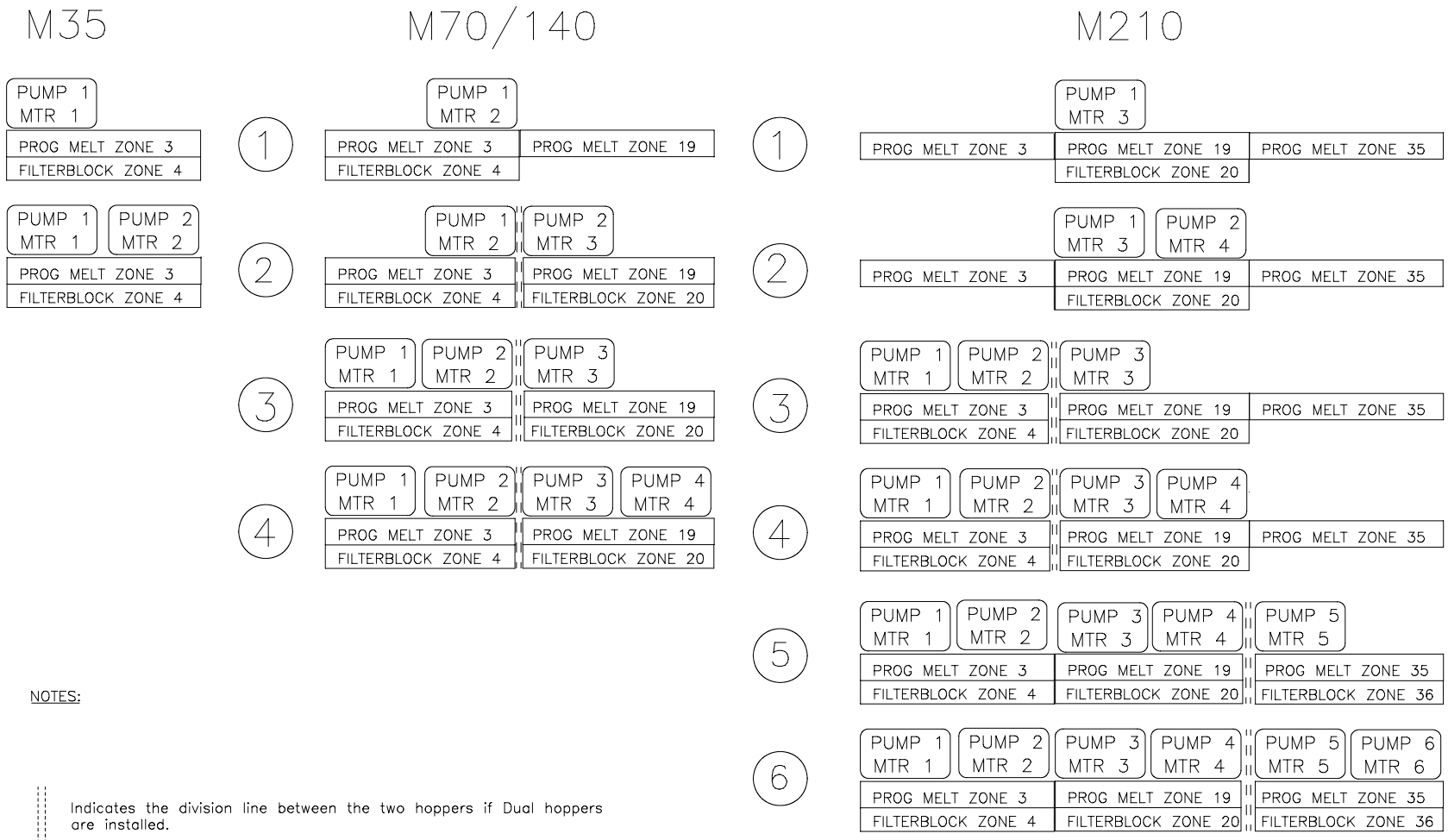
NOTES:

There are no odd hose numbers in the predefined defaults. If for example 5 hoses are installed, the default has to be loaded for 6. If necessary remove hose #6 manually from the zone table.

Indicates the division line between the two hoppers if Dual hoppers are installed.

These zone numbers are independent from number of pumps and premelt grids

Zone Configuration for Prog Melt / Filterblock / Pumps



NOTES:

Indicates the division line between the two hoppers if Dual hoppers are installed.

Zone Configuration for Premelt Grids

M35 – 1 PREMELT

PREMELT 1	ZONE 2

M70/140 – 2 PREMELTS

PREMELT 1	ZONE 2	PREMELT 2	ZONE 18

M210 – 3 PREMELTS

PREMELT 1	ZONE 2	PREMELT 2	ZONE 18	PREMELT 3	ZONE 34

M35 – 2 PREMELTS

PREMELT 1	ZONE 1
PREMELT 2	ZONE 2

M70/140 – 4 PREMELTS

PREMELT 1	ZONE 1	PREMELT 2	ZONE 17
PREMELT 3	ZONE 2	PREMELT 4	ZONE 18

M210 – 6 PREMELTS

PREMELT 1	ZONE 1	PREMELT 2	ZONE 17	PREMELT 3	ZONE 33
PREMELT 4	ZONE 2	PREMELT 5	ZONE 18	PREMELT 6	ZONE 34

NOTES:

Indicates the division line between the two hoppers if Dual hoppers are installed.

APPENDIX

DYNATEC/ ZENITH STANDARD ACCURACY GEAR PUMPS INSTALLATION, CARE & MAINTENANCE MANUAL

PN 084E427, 084E429, 084E431, 084E433, 084E435, 084E437

Part Number	Material	Type/Accuracy	Output/Rev	Shaft Seal PN
084E427	Nodular Iron	Single/ Standard	0.29cc	069X251
084E429	Nodular Iron	Single/ Standard	1.17cc	069X251
084E431	Nodular Iron	Dual/ Standard	1.17cc	069X251
084E433	Nodular Iron	Single/ Standard	2.92cc	069X251
084E435	Nodular Iron	Dual/ Standard	2.92cc	069X251
084E437	Nodular Iron	Single/ Standard	8.5cc	069X251

Thoroughly read and understand this entire manual before installation and operation of pump.

Note: The instructions given herein cover the description, installation, operation and maintenance of subject equipment. Dynatec and Zenith reserve the right to make engineering refinements that may not be reflected in this bulletin.

Manual revised 8/94

INTRODUCTION

In 1926, Zenith Pumps was appoached by the synthetic fiber industry to design a pump to provide a precise, pulseless, repeatable flow and assure better quality control. The options then were the same as those in the chemical process industry today: diaphragm, lobe, coarse gear, piston, plunger and screw pumps. Each had problems with pulsation, flow inaccuracies, multiple seal areas and slippage, which required constant calibration, high maintenence and extended downtimes.

Zenith Pumps met the challenge and designed a rotary external gear pump of unique precision and simplicity. Manufacturing techniques were developed to hold tolerances to .00005", and an internal pressure relief mechanism assured reliable precision metering. The pump's simple design of only three moving parts - two metering gears and a drive shaft - provided long life and easy maintenance.

For years since, chemical engineers have relied on Zenith to provide precision fluid handling solutions for their most difficult pumping applications. Zenith gear pumps can be found wherever precise, pulseless, repeatable metering of fluids is required.

BENEFITS

High Accuracy
Stable, repeatable flows are assured even under varying conditions of pressure, viscosity and temperature.

High Temperature Capability
Operating temperatures to 450 degrees F (232 degrees C).

Maximum Life
Only three moving parts; components are through-hardened tool and die steels to 56 HRc or better. The bodies are cast nodular iron. Replaceable sleeve bearings for low-cost rebuilds.

High Volumetric Efficiency
Maximum efficiency is achieved with optimum operating clearances and assured under pressure by built-in alignment pins.

Minimum Pulsation
Unique design offers virtually pulseless flow without valves or flexible elements to hinder performance.

Precision Construction
Ground and lapped components for close control of operating clearances.

SPECIFICATIONS

Pump Type: Rotary external spur gear, single stream.

Rotation: Clockwise

Operating Speed: 3 - 120 rpm depending upon application conditions and fluid viscosity.

Temperature: To 450 degrees F (232 degrees C)

OPERATION

All Dynatec/ Zenith High Accuracy Pumps are rear ported. Fluid enters the pump through a port drilled into the rear side plate (the side opposite the drive shaft). The fluid fills the exposed gear tooth volumes and is transported around the outer diameter of the gear pocket. As the gears mesh together, the fluid is displaced in a very precise amount out through the discharge port that is drilled alongside the inlet port in the rear plate.

Since these pumps are not self-priming, a flooded suction is usually the minimum inlet pressure required. However, when high-viscosity fluids are used, more time is required to fill the tooth volumes. As a result, the inlet pressure must be increased, or the gears must rotate at a slower speed to ensure complete volume filling and to prevent cavitation.

Dynatec/ Zenith pumps rely on the metered fluid for lubrication of internal bearing areas. The pump should never be allowed to run dry or be allowed to run with non-lubricating fluids such as water. Because of the close clearances in the bearing areas, lack of sufficient lubrication can cause pump seizure or some other catastrophic failure.

Slippage will occur across the faces of the gears from the high-pressure side to the low-pressure side. The amount of slippage depends on four factors: fluid viscoisty, speed, differential pressure and pump clearances. Under reasonably stable operating conditions, slippage is repeatable and predictable and pump operation can be adjusted to compensate.

The Standard Accuracy Pumps are designed for high-temperature and high-pressure operation. As such, operating temperatures to 450 degrees F can be achieved.

INSTALLATION

Pumps should be carefully unpacked to make sure that the shipment is complete. If any items are missing or damaged, the freight carrier and Dynatec should be notified immediately.

While the pump is composed of steel, it is a precision instrument. Dropping the pump or hitting with a non-yielding material can cause serious damage to the components. All materials are through-hardened to maximum hardness resulting in brittle material. Treat *cont.*

them as you would any other precision gauging instrument.

Dynatec/ Zenith pumps are shipped filled with a rust preventive oil. Flush the oil throughly with a cleaning solvent. It may be necessary to disassemble the seal arrangement to remove all traces of the oil, but disassemble only if necessary.

After flushing, the pump should be lubricated internally for start-up purposes. Pour a suitable high-temperature lubricant (silicone oil) into the inlet port. Rotate the metering gears until lubricant appears at the discharge port.

Mount the pump to a block with a flatness of true flat to .0001" convex and a surface finish of 4 to 8 rms to prevent leakage between the pump and block. Mounting bolts should be a Grade 8 or better. Make sure mounting bolts are lubricated with a high-temperature anti-seize compound such as DAG Dispersion #154. Bolts should be alternatively torqued in even increments up to Dynatec's recommended limit for the bolt size used. See Table 1 on page 8 for torque values.

The following is a brief "standard" installation procedure. For any special applications, considerations or simply to ask our advice, please contact Dynatec.

TO PREPARE THE PUMP FOR USE:
1. Always flush out the plumbing system before connecting the pump.
2. Filters should be installed prior to the pump inlet that filter ideally to half the pump running clearances.
3. Turn pumps by hand before running. Pumps should turn freely.
4. Engage the outer drive shaft carefully, making sure that it does not bottom in the slot of the coupling* and that it is aligned within one degree angular and .005" parallel with the true pump drive axis. (*Note: the coupling is the rotating member of the seal and depends on the internal operating pressure of the pump to force it forward and effect a seal against the carbon or metal seal plate.)
5. Tighten the mounting bolts and coupling housing screws to Dynatec recommended torque at room temperature.
6. Make sure fluid is in the pump before starting.
7. Start pump slowly and, if possible, run it with a lubricating fluid.
8. When satisfactory operation is achieved, the pump and system may be gradually brought up to normal process speeds and pressures.
9. If at any time during operation the pump does not appear to be running smoothly, stop the pump immediately to avoid any serious internal damage.

CLEANING, INSPECTION AND REPAIR

REMEMBER: Dynatec/ Zenith metering pumps are made for exacting duty. In order to develop the high pressure demanded, the clearance between the metering gears and their housing must be as small as possible, yet large enough to allow adequate lubrication. All parts are machined to extreme accuracy; critical dimensions are held between one and two ten-thousanths of an inch (.0001"/ .0002"). Because of these close running clearances, *cont.*

these pumps require careful maintenence and handling, especially of component parts. The slightest burr, nick or particle of foreign matter can cause scoring or even seizure. These pumps are precision instruments; you can't keep them too clean. Please treat them with care, and if it's at all possible, set aside a separate clean area for pump maintenance.

To clean High Accuracy Metering Pumps, place them in a suitable furnace and gradually heat in an inert atmosphere for the initial hour to prevent flashing of the polymer. Time at temperature will be related to the pump size and the degree of polymer contamination and should be determined by trial. Note: Careful control of he furnace temperature (700 degrees F max.) and atmosphere is critical. Should the temperature exceed the original tempering temperature, the steel hardness will draw back and the dimensional stability of the pump may be upset.

Another acceptable cleaning method is to immerse the pump in a fluidized bed cleaning bath. The bath shold be heated to a temperature that is sufficient to carburize the polymer. The carburization process usually takes between 3 and 12 hours, depending on the polymer type, temperature, pump size and furnace load.

CAUTION: Avoid exposing the pump to thermal shock when using this method of cleaning.

After gradually cooling to room temperature, the pump should be thoroughly flushed in a clean solvent. It may be necessary to disassemble the seal arrangement to remove polymer ash.

If present, always replace the carbon seal plate after pump burnout. If the pump was performing satisfactorily when removed from service and still turns freely after burnout, pressure test it and add a high-temperature lubricant to prepare it for return to service. To store for future use, simply add a rust preventative oil.

It is recommended that pump users institute a program of dimensional inspection of critical parts in order to keep maintenence and operting costs at a minimum. By noting the performance of a pump immediately before removing it from service and correlating the performance to measured component wear, the user can establish the maximum wear limits for the pump's critical components. Further, he can predict the service life of the pump and schedule his down-time accordingly.

As with any other Dynatec pump, high accuracy pumps may be returned to Dynatec for complete rehabilitation as necessary. This procedure may be desirable if only a few pumps are involved. If a large number of pumps are to be maintained at the user's plant, it may be worthwhile to have key personnel attend a maintenance seminar at the Zentih factory to view the manufacturing, gauging and assembly techniques involved in producting the pumps. Please contact Dynatec (at 1-800-538-9540) for further information on these items.

STANDARD ACCURACY PUMP DISASSEMBLY

If pumps are to be disassembled on a regular basis, we recommend that you establish a pump room with all the necessary tools and equipment for disassembly and cleaning with a separate "clean" area for assembly, testing and storing of rebuilt pumps.

If maintenence is required due to low delivery or seizure, the following procedure is recommended for disassembly.

NOTE: Be sure to note the location and orientation of all parts to ensure correct re-assembly. Refer to assembly drawing (located in the back of this manual) for your correct pump type.

1. Remove the seal arrangement.
2. Remove all binder screws.
3. Remove pins (10) and arbor (5) with an arbor press in the direction which disengages the press fit in the shortest distance.

NOTE: Dowels and arbors for the standard accuracy pumps are press fit in the gear/ rear plate.

4. Separate the plates by pry slots that are available in the pump. Great care should be taken not to scratch or damage the internal pump surface when prying the plates apart.
5. After disassembly, clean all components in a non-destructive solvent.
6. Wash components in an ultrasonic cleaning tank and air dry. Be careful not to bang parts together.
7. Inspect all parts for nicks, burrs, score marks and other signs of wear. The plates and faces of the gears may be hand blocked on 600 grit paper and any nicks, burrs or sharp edges can be lightly removed with a honing stone. Be careful not to round off the edges of the gear teeth while lapping.

CAUTION: Since the thickness relationship between the metering gears and the gear/ rear plate is critical to metering performance, and the gear/ rear plate is non-wearing on its sides, lapping these components is not necessary and should not be done under any circumstances.

Place a layer of 600 Grit Emery Cloth on a lapping block or plate-a granite flat is suitable. Apply light pressure to the component and turn it in a figure-8 fashion (as shown in Figure 1) approximately five times until a smooth finish appears. Turning in a circular fashion, or other non-uniform motion, may cause the ground holes to lose their perpendicularity to the faces.

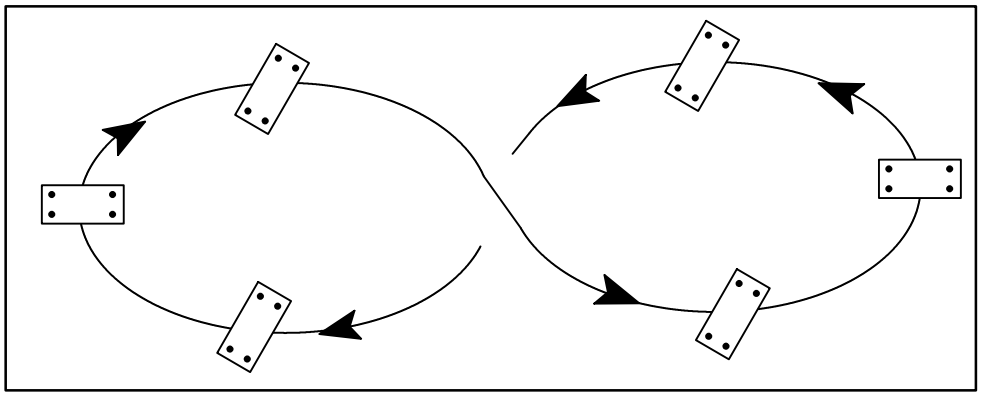
Always use clean, lint-free rags and compressed air to clean components. Paper towels are not acceptable; they may leave small pieces of paper and dust on the components. Use chemical brushes to clean between gear teeth, bores and reliefs.

8. Replace sleeve bearings as necessary and hone in the plate to the original new part specifications.
9. After each resurfacing, carefully gauge the area between the inlet and discharge ports at the mesh of the gears. This area, commonly referred to as the "throat", is the most critical part of the plate. Scoring or wear marks here will allow increased slippage from the *cont.*

high-pressure discharge port section across the throat to the lower inlet port, reducing efficiency. Therefore, carefully gauge this area for flatness after each resurfacing.

10. After all components are “hospital clean”, the pump is ready for assembly.

Figure 1



STANDARD ACCURACY PUMP RE-ASSEMBLY

NOTE: During and between each re-assembly step, manually turn the metering gears to ensure that they are free turning. If binding occurs at any time, determine the cause and correct it immediately. A tiny nick, burr or foreign particle can extensively damage a valuable pump component. Never use force in re-assembling or turning a Dynatec pump. If properly aligned, the pieces will fit easily into place and the pump will turn freely. Re-assemble as follows:

1. After all worn parts have been re-finished or replaced, all parts should be throughly cleaned in a solvent and dried.
2. Using the driven gear (5) as an up-righting fixture, carefully locate the arbor (7) over its press-fit hole in the gear/ rear plate. Smoothly drive the arbor into its hole with the help of an appropriate arbor press.
3. Place the gear/ rear plate (1) with the arbor in position in a soft-jaw vise or holding fixture.
4. Slip together the driving metering gear (6), drive shaft (4), key (8) and retaining rings (21). Position in the front of the gear/ rear plate.
5. Place the driven metering gear on its arbor and carefully mesh with the drive metering gear.
6. **NOTE**: Repeat steps 3 through 5 for four-gear pumps.
7. Position the front side plate (3).
8. Rotate the gears to ensure free rotation.
9. Press the roll pins (41) into place.
10. Lubricate the binder screws (23) with DAG dispersion #154 or a similar heat resistant lubricant and install. Torque the screws in even increments to the manufacturer’s recommended limit. It is especially important to rotate the gears frequently during this operation.
11. Re-assemble the seal arrangement, making sure the sealing surfaces are perfectly clean and free of scratches, nicks or burrs. When a carbon seal plate is used, always use a new carbon seal that has been lightly polished on 600 grit paper. When using a carbon seal, the coupling housing screws (27) should be torqued to the manufacturer’s recommended limit. For pumps with a compensation packing seal, be sure all old packing is removed *cont.*

from the packing housing.

12. Inspect the drive shaft at the seal area making sure that it is not scored, shouldered or worn. Worn shafts will result in premature seal leakage and should be replaced.

13. Inspect lip seals for wear, cracks and abrasions. Replace if needed.

14. Pack lip seals (15) with a silicone-based grease and lubricate with Parker Super-O-Lubricate or an equivalent silicone-based oil.

15. Install lip seals (15) into seal housing (9) as shown.

16. Tighten seal housing screws (22) in a cross pattern to 60 lbs./in. Check for free rotation.

SCREW TORQUE VALUES (Standard Alloy Steel)*

Screw Size & Thread (UNC Alloy Steel)		**Torque (Lubricated Threads)** Lbs.-in.	Nxm	Lbs.-ft.
#10-24 (w/ carbon seal gasket)		[50]	5.7	[4.2]
#10-24 (w/o carbon seal gasket)		[64]	7.2	[5.3]
#12-24		[120]	13.6	[10]
1/4-20		[150]	16.9	[12.5]
5/16-18		[305]	33.9	[25]
3/8-16	*into aluminum*	[360]	40.6	[30]
7/16-14	*block (hopper)*	[480]	54.2	[40]

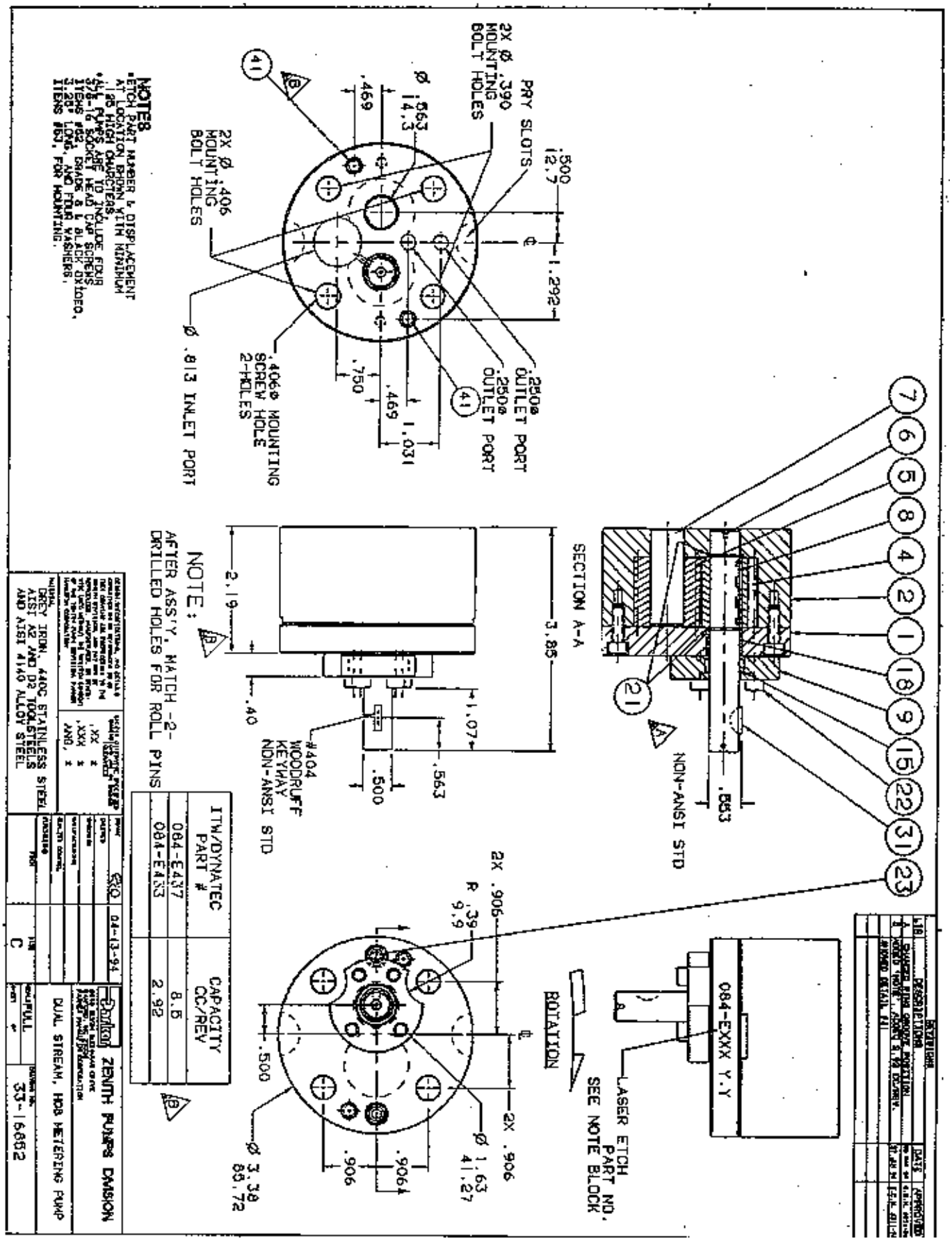
Table 1

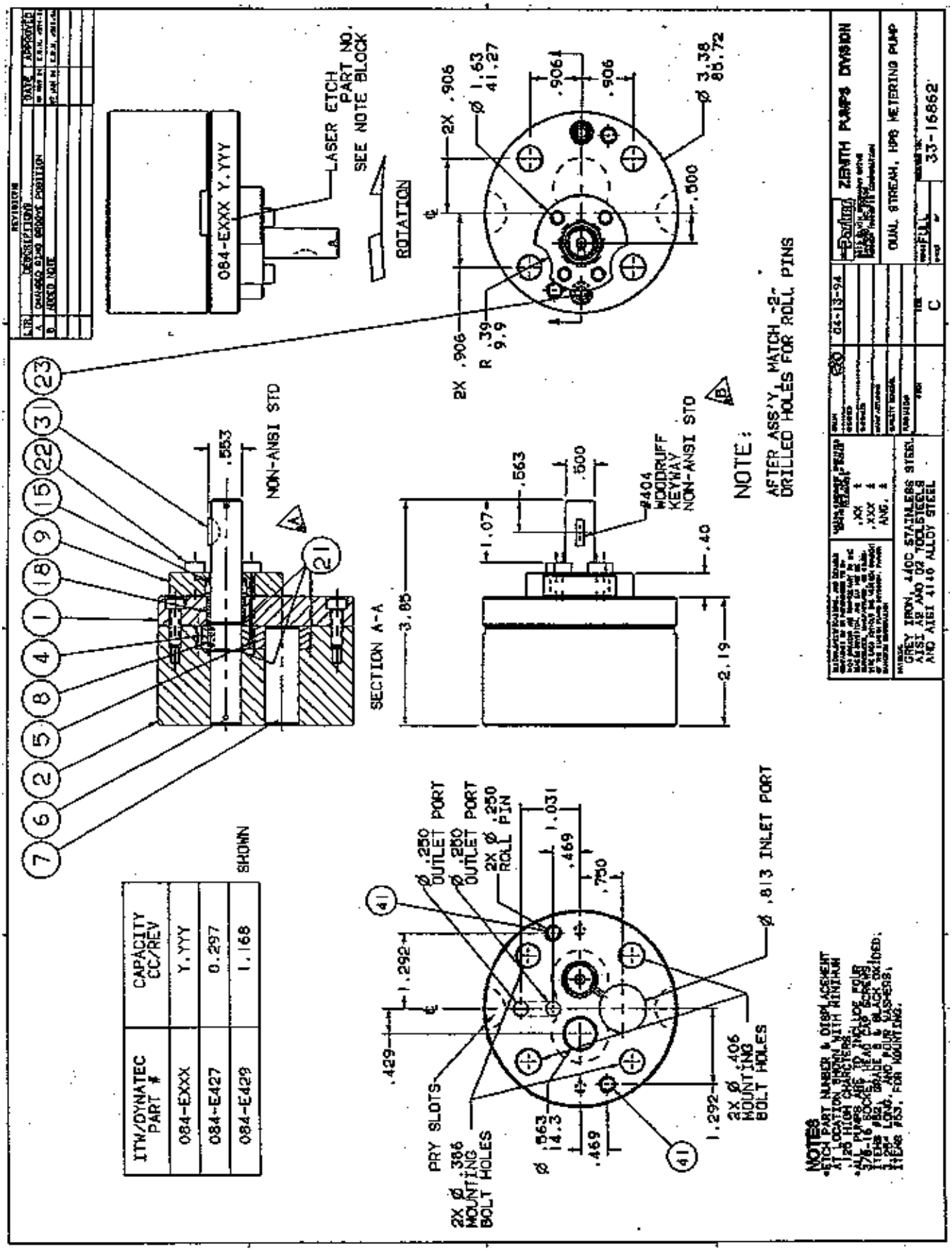
*In critical applications where control of bolt preload is important, the torque-tension relation should be determined by experimenting on the actual parts involved (including thread lubricants). At elevated temperatures, it is often desirable to reduce screw stress because of deformation (creep) under sustained loading. Screws constructed of type H-11 high-temperature alloy steel provide extremely high creep resistance.

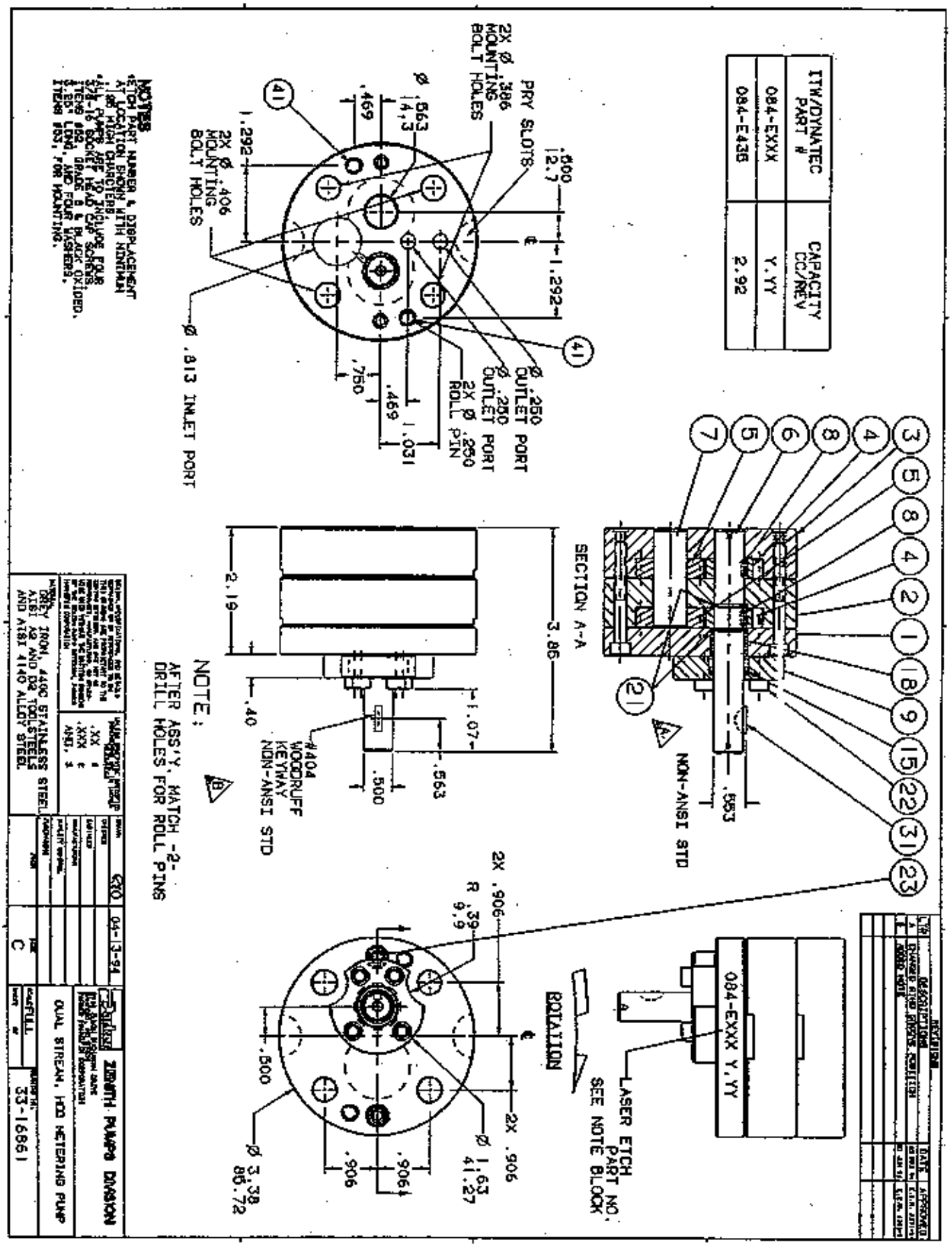
TROUBLESHOOTING GUIDE

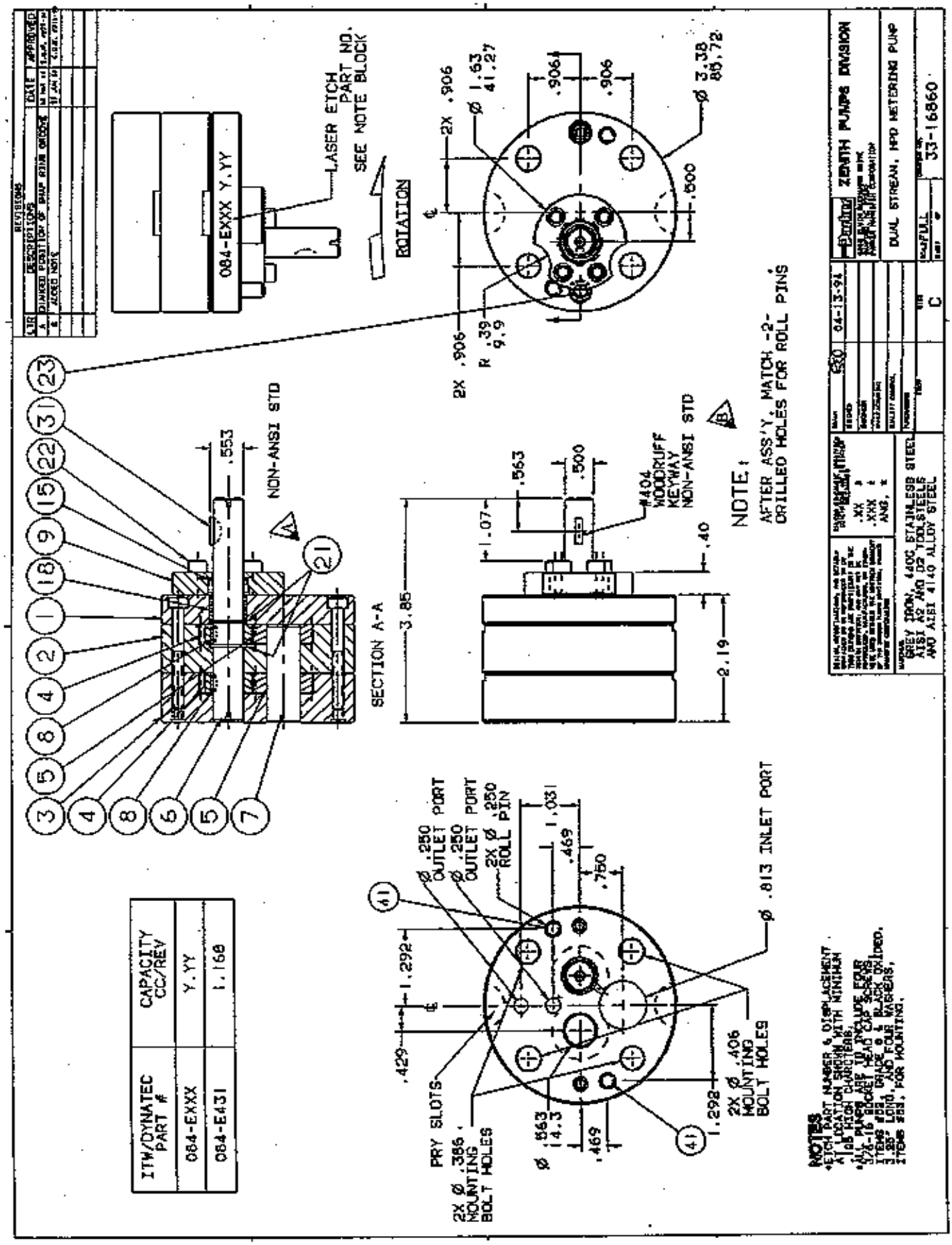
Trouble	*Probable Cause*	*Remedy*
Pump will not turn.	1. Low pump temperature.	Check temperature sensor and control loop for proper setting/ operation. Allow sufficient heat-up time.
	2. Drive malfunction.	Verify drive is powered. Check to assure all alarm circuits are clear. Check drive motor current and speed settings. Check all drive couplings.
	3. Process conditions changed.	Check process conditions for proper melt temperature, pressures, viscosities and materials.
	4. Entrained particle.	Disassemble and clean pump; replace any damaged parts.
	5. Possible internal damages.	Disassemble and clean pump; replace any damaged parts. Consult factory.
Excessive seal assembly leakage	1. Worn seal plate.	Replace seal plate and coupling if necessary.
	2. Insufficient inlet pressure.	Increase inlet pressure.
	3. Worn lip seal.*	Replace lip seal.
Reduced pump efficiency	1. Worn gear(s).	Replace worn gear(s).
	2. Worn bearings.	Replace worn bearings.
	3. Process conditions changed.	Consult factory for clearance recommended on new process conditions.

** A minor seal leak or weep is not abnormal and may be desirable for lubricating the seal surfaces.*


NOTES
ETCH PART NUMBER & DISPLACEMENT AT LOCATION SHOWN WITH MINIMUM .18 HIGH CHARACTERS.
ALL PUMPS ARE TO INCLUDE FOUR 5/8-16 SOCKET HEAD CAP SCREWS ITEMS #52, GRADE 8 & L BLACK OXIDED, 3.25" LONG, AND FOUR WASHERS, ITEMS #61, FOR MOUNTING.
PRY SLOTS
2X Ø .390 MOUNTING BOLT HOLES
Ø .663 14.3
.469
.500 12.7
1.292
.250Ø OUTLET PORT
.250Ø OUTLET PORT
1.031
.469
.750
.406Ø MOUNTING SCREW HOLE 2-HOLES
2X Ø .406 MOUNTING BOLT HOLES
Ø .813 INLET PORT
SECTION A-A
NON-ANSI STD
.553
LASER ETCH PART NO. SEE NOTE BLOCK
084-EXXX Y.Y
ROTATION
2X .906
R .39 9.9
2X .906
Ø 1.63 41.27
.500
.906
.9064
Ø 3.38 85.72
3.85
1.07
.563
.500
.40
#404 WOODRUFF KEYWAY NON-ANSI STD
2.19
NOTE: AFTER ASS'Y, MATCH -2- DRILLED HOLES FOR ROLL PINS
ITW/DYNATEC PART #
CAPACITY CC/REV
084-E407
8.5
084-E483
2.92
ZENITH PUMPS DIVISION
DUAL STREAM, HOB METERING PUMP
33-16852
DREY IRON, 440C STAINLESS STEEL AISI A2 AND D2 TOOLSTEELS AND AISI 4140 ALLOY STEEL
04-13-94
C


LASER ETCH PART NO. SEE NOTE BLOCK
084-EXXX Y.YYY
ROTATION
2X .906
Ø 1.63 41.27
.906
.906
Ø 3.38 85.72
.500
2X .906
R .39 9.9
NON-ANSI STD
.563
SECTION A-A
3.85
1.07
.563
.500
#404 WOODRUFF KEYWAY NON-ANSI STD
.40
2.19
NOTE:
AFTER ASS'Y, MATCH -2- DRILLED HOLES FOR ROLL PINS
Ø .250 OUTLET PORT
Ø .250 OUTLET PORT
2X Ø .250 ROLL PIN
1.031
.469
.750
1.292
.429
Ø .813 INLET PORT
PRY SLOTS
2X Ø .386 MOUNTING BOLT HOLES
Ø .563 14.3
.469
1.292
2X Ø .406 MOUNTING BOLT HOLES
ZENITH PUMPS DIVISION
DUAL STREAM, HP6 METERING PUMP
33-16862
GREY IRON, 440C STAINLESS STEEL AISI A8 AND D2 TOOLSTEELS AND AISI 4140 ALLOY STEEL
04-13-94
C
NOTES
ITW/DYNATEC PART #
CAPACITY CC/REV
084-EXXX
Y.YYY
084-E427
0.297
084-E429
1.168
SHOWN


ITW/DYNATEC PART #
084-EXXX
084-E436
CAPACITY CC/REV
Y.YY
2.92
PRY SLOTS
2X Ø .386 MOUNTING BOLT HOLES
Ø .563 14.3
2X Ø .406 MOUNTING BOLT HOLES
Ø .813 INLET PORT
Ø .250 OUTLET PORT
Ø .250 OUTLET PORT
2X Ø .250 ROLL PIN
1.292
.600 12.7
.469
.750
.031
SECTION A-A
NON-ANSI STD
.563
LASER ETCH PART NO. SEE NOTE BLOCK
084-EXXX Y.YY
ROTATION
2X .906
R .39 9.9
2X .906
Ø 1.63 41.27
.500
.906
.906
Ø 3.38 85.72
3.86
2.19
1.07
.563
.500
.40
#404 WOODRUFF KEYWAY NON-ANSI STD
NOTE:
AFTER ASS'Y, MATCH -2- DRILL HOLES FOR ROLL PINS
MOTES
ETCH PART NUMBER & DISPLACEMENT AT LOCATION SHOWN WITH MINIMUM .08" HIGH CHARACTERS.
ALL SCREWS ARE TO INCLUDE FOUR 5/16-18 BLACK OXIDE HEX HEAD CAP SCREWS ITEMS #02 GRADE 8 & BLACK OXIDED, ITEMS #01, FOR MOUNTING.
MATERIAL
GREY IRON, 440C STAINLESS STEEL AISI A2 AND D2 TOOLSTEELS AND AISI 4140 ALLOY STEEL
DRAWN
CHKD
ENGR APPR
MFG APPR
Q.A.
COMMENTS
NEXT ASSY
APPLICATION
USED ON
DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACTIONS ±
.XX ±
.XXX ±
ANG. ±
MATERIAL
FINISH
DO NOT SCALE DRAWING
NEXT ASSY
USED ON
APPLICATION
DUAL STREAM, HOT METERING PUMP
DO NOT SCALE DRAWING
DRAWING NO.
33-16861
SIZE
C
SCALE
FULL
SHEET
ZENITH PUMPS DIVISION
ITW Dynatec
DATE
04-13-94
REVISIONS
LTR
DESCRIPTION
DATE
APPROVED
A
CHANGED BLIND HOLES POSITION
4-13-94
B
ADDED NOTE


LASER ETCH PART NO. SEE NOTE BLOCK
084-EXXX Y.YY
ROTATION
2X .906
Ø 1.63 41.27
Ø 3.38 85.72
.500
2X .906
R .39 9.9
NON-ANSI STD
.553
SECTION A-A
3.85
1.07
.563
.500
#404 WOODRUFF KEYWAY NON-ANSI STD
.40
2.19
NOTE:
AFTER ASS'Y, MATCH -2- DRILLED HOLES FOR ROLL PINS
Ø .813 INLET PORT
Ø .250 OUTLET PORT
Ø .250 OUTLET PORT
2X Ø .250 ROLL PIN
1.031
.469
.750
1.292
.429
PRY SLOTS
2X Ø .386 MOUNTING BOLT HOLES
Ø .563 14.3
.469
1.292
2X Ø .406 MOUNTING BOLT HOLES
ITW/DYNATEC PART #
CAPACITY CC/REV
084-EXXX
Y.YY
084-E431
1.168
NOTES
ZENITH PUMPS DIVISION
DUAL STREAM, HPD METERING PUMP
33-16860
C

DYNATEC/ ZENITH HIGH ACCURACY GEAR PUMPS INSTALLATION, CARE & MAINTENANCE MANUAL

PN 084E428, 084E430, 084E432, 084E434, 084E436

Part Number	Material	Type/Accuracy	Output/Rev	Shaft Seal PN
084E428	Tool Steel	Single/ High	0.297cc	069X251
084E430	Tool Steel	Single/ High	1.168cc	069X251
084E432	Tool Steel	Dual/ High	1.168cc	069X251
084E434	Tool Steel	Single/ High	2.920cc	069X251
084E436	Tool Steel	Dual/ High	2.920cc	069X251

Thoroughly read and understand this entire manual before installation and operation of pump.

Note: The instructions given herein cover the description, installation, operation and maintenance of subject equipment. Dynatec and Zenith reserve the right to make engineering refinements that may not be reflected in this bulletin.

Manual revised 8/94

INTRODUCTION

In 1926, Zenith Pumps was appoached by the synthetic fiber industry to design a pump to provide a precise, pulseless, repeatable flow and assure better quality control. The options then were the same as those in the chemical process industry today: diaphragm, lobe, coarse gear, piston, plunger and screw pumps. Each had problems with pulsation, flow inaccuracies, multiple seal areas and slippage, which required constant calibration, high maintenence and extended downtimes.

Zenith Pumps met the challenge and designed a rotary external gear pump of unique precision and simplicity. Manufacturing techniques were developed to hold tolerances to .00005", and an internal pressure relief mechanism assured reliable precision metering. The pump's simple design of only three moving parts - two metering gears and a drive shaft - provided long life and easy maintenance.

For years since, chemical engineers have relied on Zenith to provide precision fluid handling solutions for their most difficult pumping applications. Zenith gear pumps can be found wherever precise, pulseless, repeatable metering of fluids is required.

BENEFITS

High Accuracy
Stable, repeatable flows are assured even under varying conditions of pressure, viscosity and temperature.

High Temperature Capability
Operating temperatures to 550 degrees F (288 degrees C).

Maximum Life
Only three moving parts; components are through-hardened tool and die steels to 62 HRc or better. Replaceable sleeve bearings for low-cost rebuilds.

High Volumetric Efficiency
Maximum efficiency is achieved with optimum operating clearances and assured under pressure by built-in alignment dowels.

Minimum Pulsation
Unique design offers virtually pulseless flow without valves or flexible elements to hinder performance.

Precision Construction
Ground and lapped components for close control of operating clearances.

SPECIFICATIONS

Pump Type: Rotary external spur gear, single stream.

Rotation: Clockwise

Operating Speed: 3 - 120 rpm depending upon application conditions and fluid viscosity.

Temperature: To 550 degrees F (288 degrees C)

DESIGN

Dynatec/ Zenith High Accuracy Metering Pumps consist of two gears rotating in mesh within a closely fitted housing that is comprised of three plates. The center gear plate fits closely around the outside diameter of the metering gears. The front and rear plates sandwich the center plate and restrict axial movement of the gears. Power is transmitted to the gears by the drive shaft which is a through shaft. Shaft sealing is accomplished with a high temperature cup seal.

High-accuracy pumps are precision instruments requiring skilled and careful maintenence. Constructed of high-quality tool and die steels such as AISI D2, M2, M4 and CPM-M4, or other high-performance alloys, they are tempered after heat treatment to hardnesses ranging from HRc 58 to HRc 64. Since the thermal expansion rates for all three steels are almost identical and are otherwise entirely compatible, it is possible to combine them so as to take advantage of their best qualities in the most economical way.

The Type D2 tool steel is often selected for the side and center plates as it offers good abrasion resistance and it is the most economical of the three steels we most commonly use. Type D2 will also provide a higher degree of corrosion resistance than M2 or M4.

The portion of the side plate subject to the most wear is the shaft bearing hole, which has an easily replaceable, inexpensive sleeve bearing that can be made of the extremely wear resistant Type M4 tool steel. Types M2 and CPM-M4 steels are commonly used for the metering gears, drive shaft and universal seal coupling, due to their superior torsional strength and abrasion resistance for these items that are the most critical to proper metering performance.

OPERATION

All Dynatec/ Zenith High Accuracy Pumps are rear ported. Fluid enters the pump through a port drilled into the rear side plate (the side opposite the drive shaft). The fluid fills the exposed gear tooth volumes and is transported around the outer diameter of the gear pocket. As the gears mesh together, the fluid is displaced in a very precise amount out through the discharge port that is drilled alongside the inlet port in the rear plate. *cont.*

Since these pumps are not self-priming, a flooded suction is usually the minimum inlet pressure required. However, when high-viscosity fluids are used, more time is required to fill the tooth volumes. As a result, the inlet pressure must be increased, or the gears must rotate at a slower speed to ensure complete volume filling and to prevent cavitation.

Dynatec/ Zenith pumps rely on the metered fluid for lubrication of internal bearing areas. The pump should never be allowed to run dry or be allowed to run with non-lubricating fluids such as water. Because of the close clearances in the bearing areas, lack of sufficient lubrication can cause pump seizure or some other catastrophic failure.

Slippage will occur across the faces of the gears from the high-pressure side to the low-pressure side. The amount of slippage depends on four factors: fluid viscoisty, speed, differential pressure and pump clearances. Under reasonably stable operating conditions, slippage is repeatable and predictable and pump operation can be adjusted to compensate.

The High Accuracy Pumps are designed for high-temperature and high-pressure operation. As such, operating temperatures to 550 degrees F can be achieved.

INSTALLATION

Pumps should be carefully unpacked to make sure that the shipment is complete. If any items are missing or damaged, the freight carrier and Dynatec should be notified immediately.

While the pump is composed of steel, it is a precision instrument. Dropping the pump or hitting with a non-yielding material can cause serious damage to the components. All materials are through-hardened to maximum hardness resulting in brittle material. Treat them as you would any other precision gauging instrument.

Dynatec/ Zenith pumps are shipped filled with a rust preventive oil. Flush the oil throughly with a cleaning solvent. It may be necessary to disassemble the seal arrangement to remove all traces of the oil, but disassemble only if necessary.

After flushing, the pump should be lubricated internally for start-up purposes. Pour a suitable high-temperature lubricant (silicone oil) into the inlet port. Rotate the metering gears until lubricant appears at the discharge port.

Mount the pump to a block with a flatness of true flat to .0001” convex and a surface finish of 4 to 8 rms to prevent leakage between the pump and block. Mounting bolts should be a Grade 8 or better. Make sure mounting bolts are lubricated with a high-temperature anti-seize compound such as DAG Dispersion #154. Bolts should be alternatively torqued in even increments up to Dynatec’s recommended limit for the bolt size used. See Table 1 on page 23 for torque values.

The following is a brief “standard” installation procedure. For any special applications, considerations or simply to ask our advice, please contact Dynatec. *cont.*

TO PREPARE THE PUMP FOR USE:
1. Always flush out the plumbing system before connecting the pump.
2. Filters should be installed prior to the pump inlet that filter ideally to half the pump running clearances.
3. Turn pumps by hand before running. Pumps should turn freely.
4. Engage the outer drive shaft carefully, making sure that it does not bottom in the slot of the coupling* and that it is aligned within one degree angular and .005" parallel with the true pump drive axis. (*Note: the coupling is the rotating member of the seal and depends on the internal operating pressure of the pump to force it forward and effect a seal against the carbon or metal seal plate.)
5. Tighten the mounting bolts and coupling housing screws to Dynatec recommended torque at room temperature.
6. Make sure fluid is in the pump before starting.
7. Start pump slowly and, if possible, run it with a lubricating fluid.
8. When satisfactory operation is achieved, the pump and system may be gradually brought up to normal process speeds and pressures.
9. If at any time during operation the pump does not appear to be running smoothly, stop the pump immediately to avoid any serious internal damage.

CLEANING, INSPECTION AND REPAIR

REMEMBER: Dynatec/ Zenith metering pumps are made for exacting duty. In order to develop the high pressure demanded, the clearance between the metering gears and their housing must be as small as possible, yet large enough to allow adequate lubrication. All parts are machined to extreme accuracy; critical dimensions are held between one and two ten-thousanths of an inch (.0001"/ .0002"). Because of these close running clearances, these pumps require careful maintenence and handling, especially of component parts. The slightest burr, nick or particle of foreign matter can cause scoring or even seizure. These pumps are precision instruments; you can't keep them too clean. Please treat them with care, and if it's at all possible, set aside a separate clean area for pump maintenance.

To clean High Accuracy Metering Pumps, place them in a suitable furnace and gradually heat in an inert atmosphere for the initial hour to prevent flashing of the polymer. Time at temperature will be related to the pump size and the degree of polymer contamination and should be determined by trial. Note: Careful control of he furnace temperature (950 degrees F max.) and atmosphere is critical. Should the temperature exceed the original tempering temperature, the steel hardness will draw back and the dimensional stability of the pump may be upset.

Another acceptable cleaning method is to immerse the pump in a fluidized bed cleaning bath. The bath shold be heated to a temperature that is sufficient to carburize the polymer. The carburization process usually takes between 3 and 12 hours, depending on the polymer type, temperature, pump size and furnace load. *cont.*

CAUTION: Avoid exposing the pump to thermal shock when using this method of cleaning.

After gradually cooling to room temperature, the pump should be thoroughly flushed in a clean solvent. It may be necessary to disassemble the seal arrangement to remove polymer ash.

If present, always replace the carbon seal plate after pump burnout. If the pump was performing satisfactorily when removed from service and still turns freely after burnout, pressure test it and add a high-temperature lubricant to prepare it for return to service. To store for future use, simply add a rust preventative oil.

It is recommended that pump users institute a program of dimensional inspection of critical parts in order to keep maintenence and operting costs at a minimum. By noting the performance of a pump immediately before removing it from service and correlating the performance to measured component wear, the user can establish the maximum wear limits for the pump's critical components. Further, he can predict the service life of the pump and schedule his down-time accordingly.

As with any other Dynatec pump, high accuracy pumps may be returned to Dynatec for complete rehabilitation as necessary. This procedure may be desirable if only a few pumps are involved. If a large number of pumps are to be maintained at the user's plant, it may be worthwhile to have key personnel attend a maintenance seminar at the Zentih factory to view the manufacturing, gauging and assembly techniques involved in producting the pumps. Please contact Dynatec (at 1-800-538-9540) for further information on these items.

HIGH ACCURACY PUMP DISASSEMBLY

If pumps are to be disassembled on a regular basis, we recommend that you establish a pump room with all the necessary tools and equipment for disassembly and cleaning with a separate "clean" area for assembly, testing and storing of rebuilt pumps.

If maintenence is required due to low delivery or seizure, the following procedure is recommended for disassembly.

NOTE: Be sure to note the location and orientation of all parts to ensure correct re-assembly. Refer to assembly drawing (located in the back of this manual) for your correct pump type.

1. Remove the seal arrangement.
2. Remove all binder screws.
3. Remove dowels (10) and arbor (5) with an arbor press in the direction which disengages the press fit in the shortest distance.

NOTE: Dowels and arbors for the high accuracy pumps are press fit in the rear front plate (1) and slip fit in the center (2) and side plates (3). *cont.*

4. Separate the plates by pry slots. Great care should be taken not to scratch or damage the internal pump surface when prying the plates apart.

5. After disassembly, clean all components in a glass bead blast cabinet to remove any debris remaining after heat cleaning. Alternative, non-destructive cleaning methods such as water jet or solvents are also acceptable.

6. Wash components in an ultrasonic cleaning tank and air dry. Be careful not to bang parts together.

7. Inspect all parts for nicks, burrs, score marks and other signs of wear. The plates and faces of the gears may be hand blocked on 400/600 grit paper and any nicks, burrs or sharp edges can be lightly removed with a honing stone. Be careful not to round off the edges of the gear teeth while lapping.

CAUTION: Since the thickness relationship between the metering gears and the center plate is critical to metering performance, and the center plate is non-wearing on its sides, lapping these components is not necessary and should not be done under any circumstances.

Place a layer of 400 Grit Emery Cloth on a lapping block or plate-a granite flat is suitable. Apply light pressure to the component and turn it in a figure-8 fashion (as shown in Figure 1) approximately ten times until a smooth finish appears. Turning in a circular fashion, or other non-uniform motion, may cause the ground holes to lose their perpendicularity to the faces.

Always use clean, lint-free rags and compressed air to clean components. Paper towels are not acceptable; they may leave small pieces of paper and dust on the components. Use chemical brushes to clean between gear teeth, bores and reliefs.

8. Replace sleeve bearings as necessary and hone in the plate to the original new part specifications.

9. After each resurfacing, carefully gauge the area between the inlet and discharge ports at the mesh of the gears. This area, commonly referred to as the “throat”, is the most critical part of the plate. Scoring or wear marks here will allow increased slippage from the high-pressure discharge port section across the throat to the lower inlet port, reducing efficiency. Therefore, carefully gauge this area for flatness after each resurfacing.

10. After all components are “hospital clean”, the pump is ready for assembly.

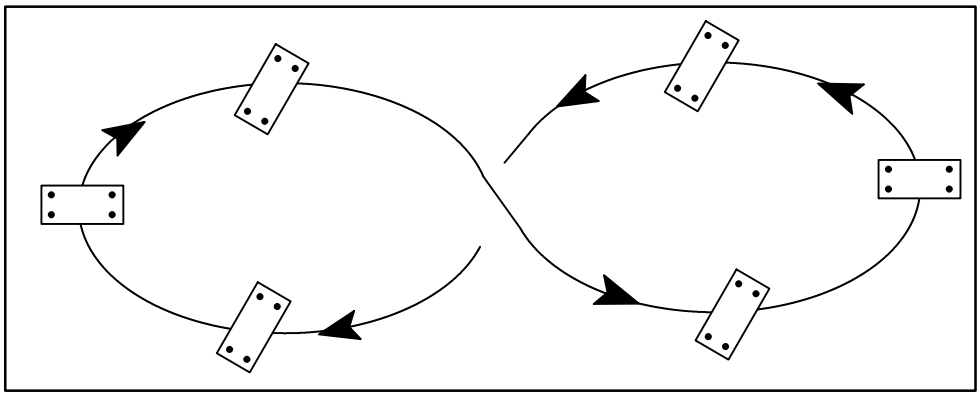


Figure 1

HIGH ACCURACY PUMP RE-ASSEMBLY

NOTE: During and between each re-assembly step, manually turn the metering gears to ensure that they are free turning. If binding occurs at any time, determine the cause and correct it immediately. A tiny nick, burr or foreign particle can extensively damage a valuable pump component. Never use force in re-assembling or turning a Dynatec pump. If properly aligned, the pieces will fit easily into place and the pump will turn freely. Re-assemble as follows:

1. After all worn parts have been re-finished or replaced, all parts should be throughly cleaned in a solvent and dried.
2. Using the driven gear (7) as an up-righting fixture, carefully locate the arbor (5) over its press-fit hole with the help of an appropriate arbor press.
3. Place the rear side plate (3) with the arbor in position in a soft-jaw vise or holding fixture.
4. Slip together the driving metering gear (6), drive shaft (4), key (8) and retaining ring. Position in the front of the side plate by installing the drive shaft through the bearing (49).
5. Place the driven metering gear on its arbor and carefully mesh with the drive metering gear.
6. Carefully lower the center plate (2) over the gears.

NOTE: Repeat steps 5 and 6 for four-gear pumps, placing the middle plate between gear plates.

7. Position the front side plate (1).
8. Rotate the gears to ensure free rotation.
9. Press the dowels (10) into place moving in the direction of the shortest press distance. (Usually from the rear side of the pump.)
10. Lubricate the binder screws (47, 48) with DAG dispersion #154 or a similar heat resistant lubricant and install. Torque the screws in even increments to the manufacturer's recommended limit. It is especially important to rotate the gears frequently during this operation.
11. Re-assemble the seal arrangement, making sure the sealing surfaces are perfectly clean and free of scratches, nicks or burrs. When a carbon seal plate is used, always use a new carbon seal that has been lightly polished on 400/600 grit paper. When using a carbon seal, the coupling housing screws (27) should be torqued to the manufacturer's recommended limit. For pumps with a compensation packing seal, be sure all old packing is removed from the packing housing.
12. Inspect the drive shaft at the seal area making sure that it is not scored, shouldered or worn. Worn shafts will result in premature seal leakage and should be replaced.
13. Pack lip seals (15) with a silicone-based grease and lubricate with Parker Super-O-Lubricate or an equivalent silicone-based oil.
14. Install lip seals into seal housing (22) as shown.
15. Tighten seal housing screws to 60 lbs./in. Check for rotation.

SCREW TORQUE VALUES (Standard Alloy Steel)*

Screw Size & Thread (UNC Alloy Steel)		**Torque (Lubricated Threads)** Lbs.-in.	Nxm	Lbs.-ft.
#10-24 (w/ carbon seal gasket)		[50]	5.7	[4.2]
#10-24 (w/o carbon seal gasket)		[64]	7.2	[5.3]
#12-24		[120]	13.6	[10]
1/4-20		[150]	16.9	[12.5]
5/16-18		[305]	33.9	[25]
3/8-16	*into aluminum*	[360]	40.6	[30]
7/16-14	*block (hopper)*	[480]	54.2	[40]

Table 1

*In critical applications where control of bolt preload is important, the torque-tension relation should be determined by experimenting on the actual parts involved (including thread lubricants). At elevated temperatures, it is often desirable to reduce screw stress because of deformation (creep) under sustained loading. Screws constructed of type H-11 high-temperature alloy steel provide extremely high creep resistance.

TROUBLESHOOTING GUIDE

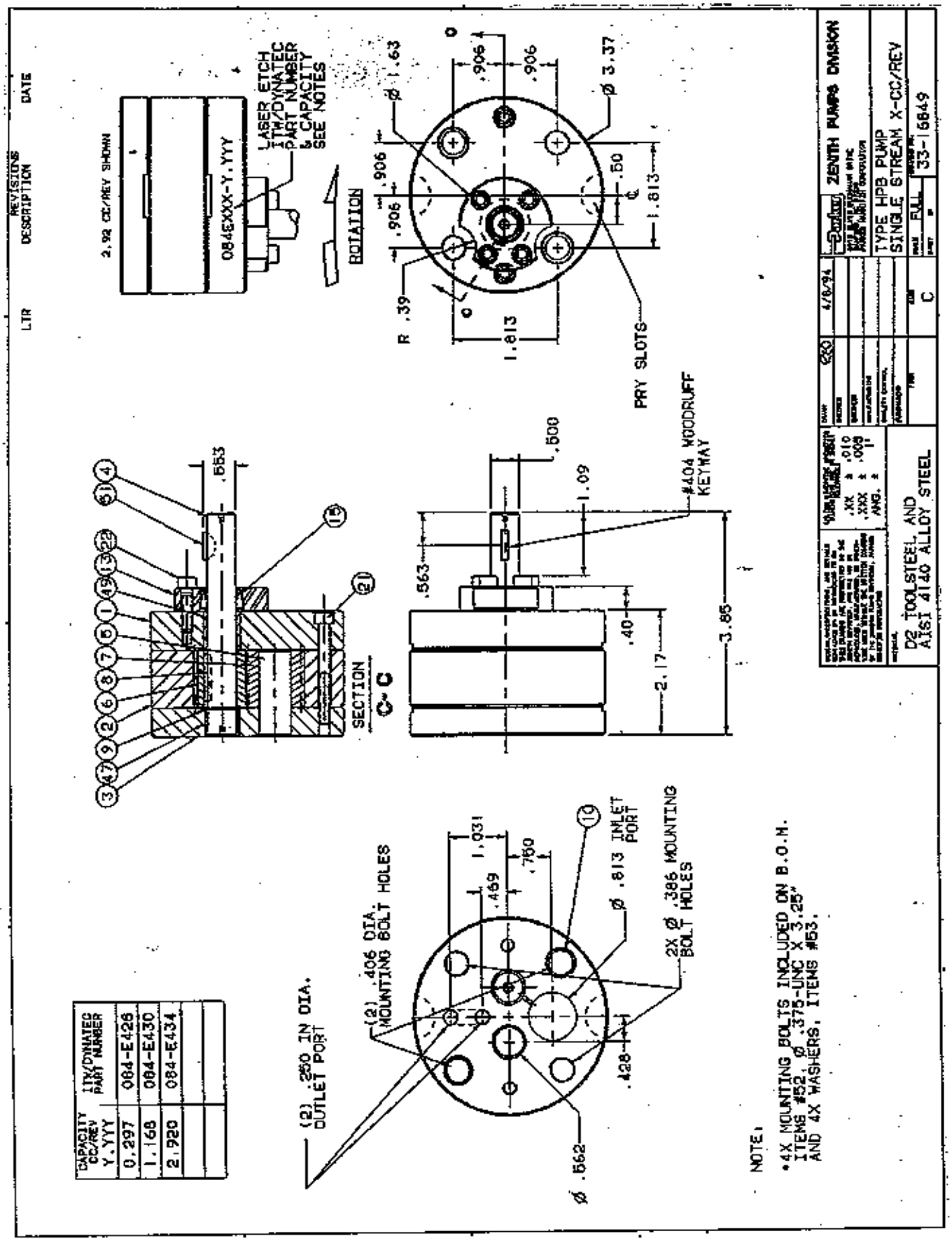
Trouble	***Probable Cause***	***Remedy***
Pump will not turn.	1. Low pump temperature.	Check temperature sensor and control loop for proper setting/ operation. Allow sufficient heat-up time.
	2. Drive malfunction.	Verify drive is powered. Check to assure all alarm circuits are clear. Check drive motor current and speed settings. Check all drive couplings.
	3. Process conditions changed.	Check process conditions for proper melt temperature, pressures, viscosities and materials.
	4. Entrained particle.	Disassemble and clean pump; replace any damaged parts.

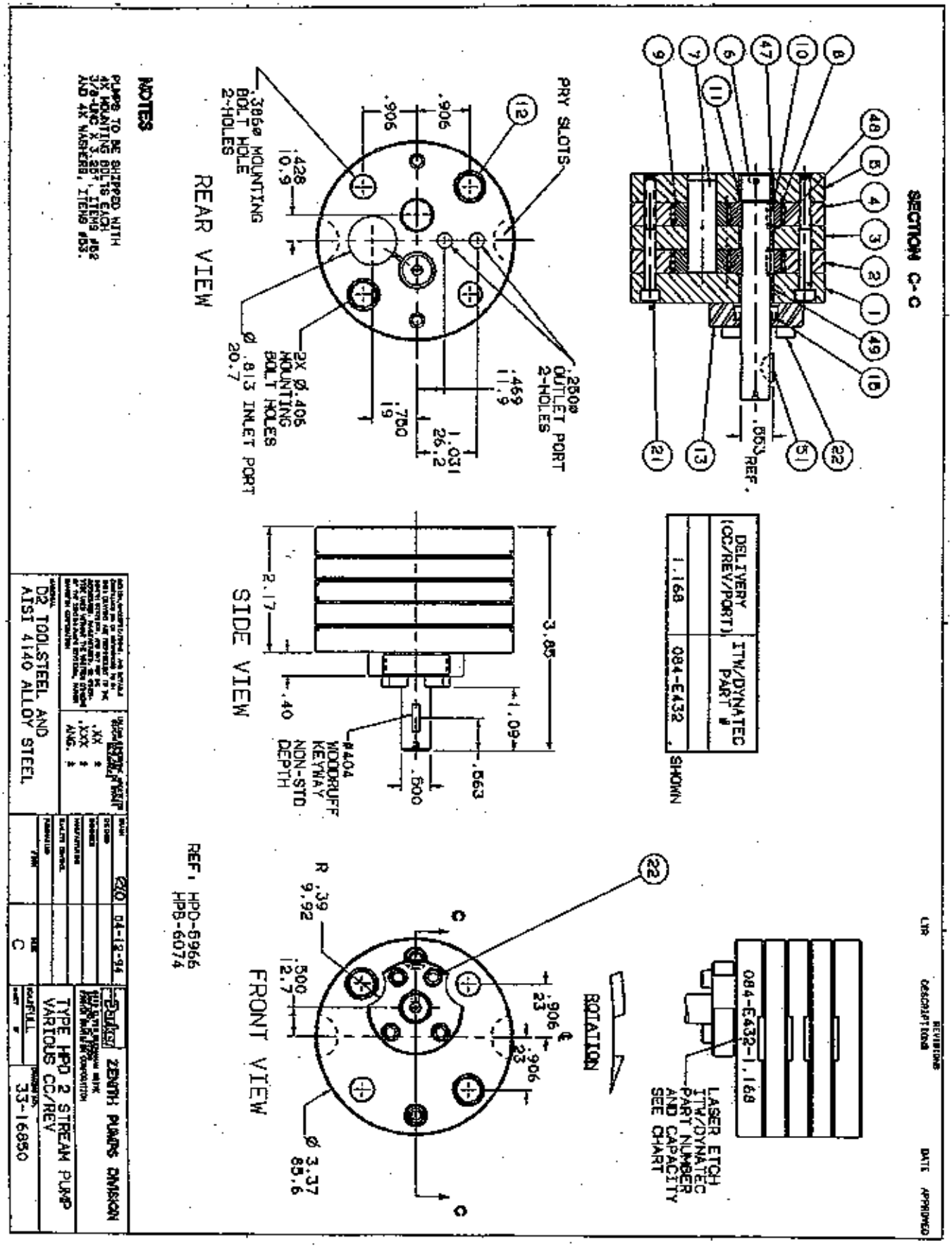
cont.

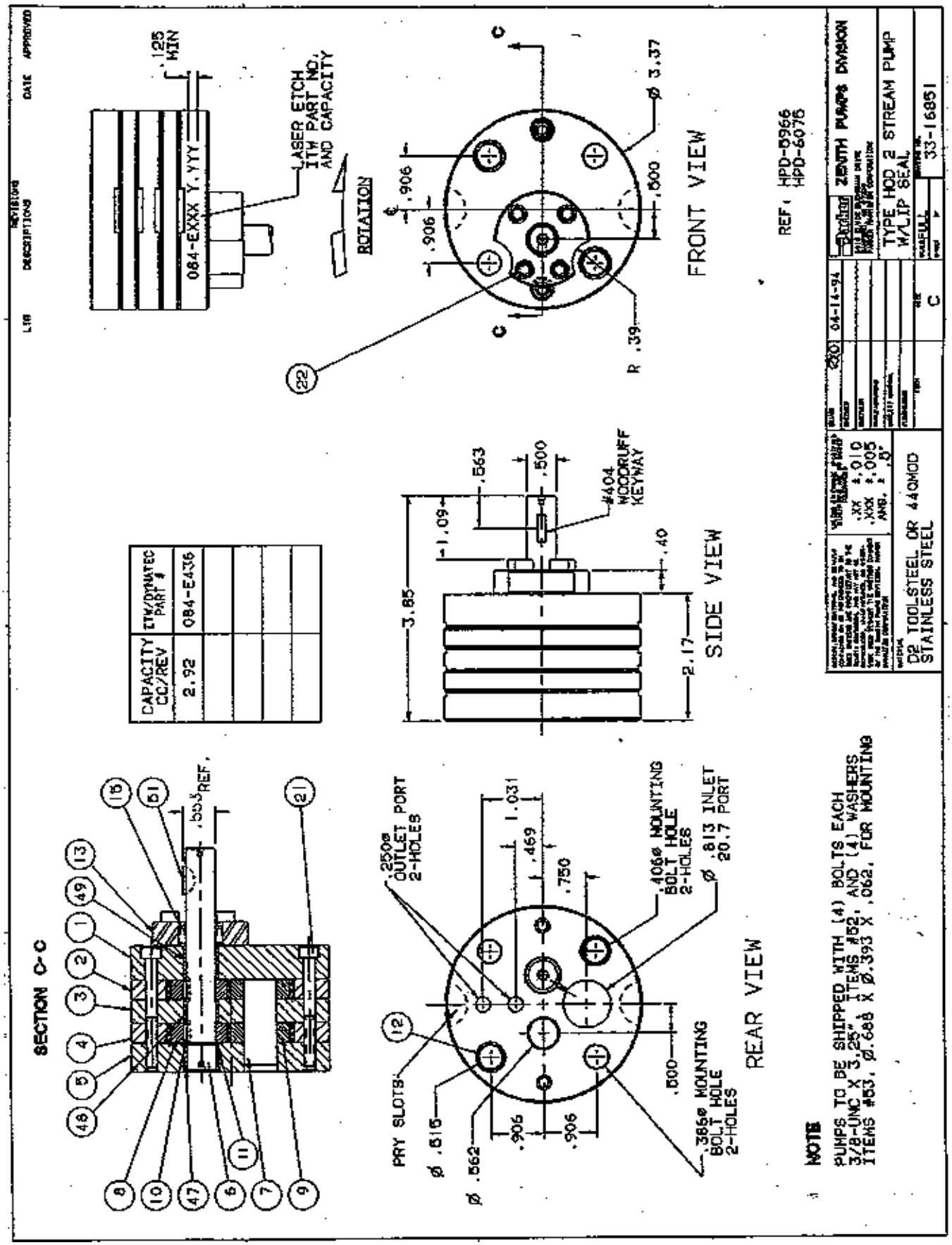
TROUBLESHOOTING GUIDE, ***continued***

Trouble	***Probable Cause***	***Remedy***
	5. Possible internal damages.	Disassemble and clean pump; replace any damaged parts. Consult factory.
Excessive seal assembly leakage	1. Worn seal plate.	Replace seal plate and coupling if necessary.
	2. Insufficient inlet pressure.	Increase inlet pressure.
	3. Worn lip seal.*	Replace lip seal.
Reduced pump efficiency	1. Worn gear(s).	Replace worn gear(s).
	2. Worn bearings.	Replace worn bearings.
	3. Process conditions changed.	Consult factory for clearance recommended on new process conditions.

* A minor seal leak or weep is not abnormal and may be desirable for lubricating the seal surfaces.


REVISIONS
LTR DESCRIPTION DATE
2.92 CC/REV SHOWN
084EXXX-Y.YYY
LASER ETCH ITW/DYNATEC PART NUMBER & CAPACITY SEE NOTES
ROTATION
Ø 1.63
.906
.906
.906
Ø 3.37
.50
1.813
R .39
1.813
PRY SLOTS
.563
SECTION C-C
.500
1.09
#404 WOODRUFF KEYWAY
.40
2.17
3.85
(2) .250 IN DIA. OUTLET PORT
(2) .406 DIA. MOUNTING BOLT HOLES
1.031
.469
.760
Ø .813 INLET PORT
2X Ø .386 MOUNTING BOLT HOLES
.428
Ø .562
NOTE:
• 4X MOUNTING BOLTS INCLUDED ON B.O.M. ITEMS #52, Ø .375-UNC X 3.25" AND 4X WASHERS, ITEMS #53.
CAPACITY CC/REV Y.YYY
ITW/DYNATEC PART NUMBER
0.297 084-E426
1.168 084-E430
2.920 084-E434
D2 TOOLSTEEL AND AISI 4140 ALLOY STEEL
4/6/94
ZENITH PUMPS DIVISION
TYPE HPB PUMP
SINGLE STREAM X-CC/REV
SIZE C
33-16849

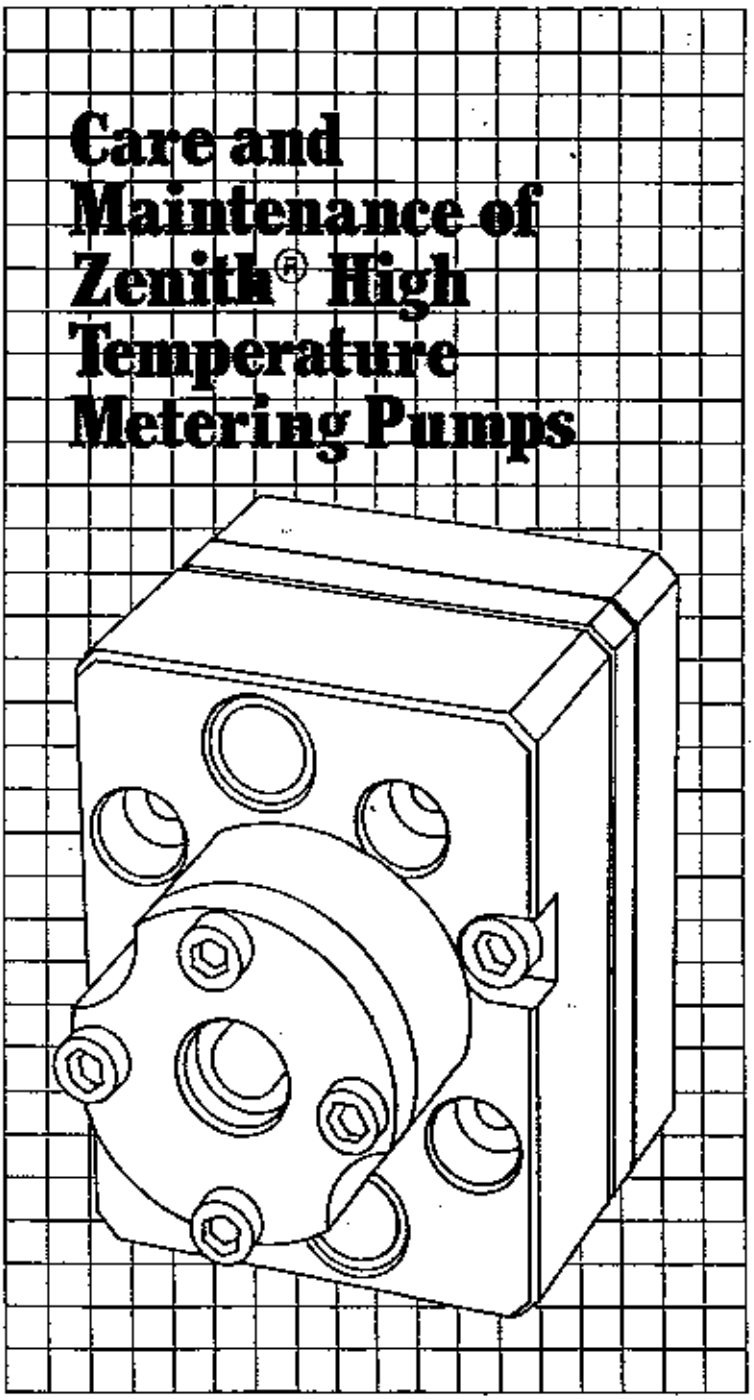

SECTION C-C
REAR VIEW
SIDE VIEW
FRONT VIEW
ROTATION
PRY SLOTS
.250ø OUTLET PORT 2-HOLES
2X Ø.406 MOUNTING BOLT HOLES
Ø.813 INLET PORT
.386ø MOUNTING BOLT HOLE 2-HOLES
.553 REF.
DELIVERY (CC/REV/PORT)
ITW/DYNATEC PART #
1.168
084-E432
SHOWN
LASER ETCH ITW/DYNATEC PART NUMBER AND CAPACITY SEE CHART
084-E432-1.168
#404 WOODRUFF KEYWAY NON-STD DEPTH
REF: HPD-5966
HPB-6074
NOTES
PUMPS TO BE SHIPPED WITH 4X MOUNTING BOLTS EACH 3/8-UNC X 3.25", ITEMS #52 AND 4X WASHERS, ITEMS #53.
D2 TOOLSTEEL AND AISI 4140 ALLOY STEEL
ZENITH PUMPS DIVISION
TYPE HPD 2 STREAM PUMP VARIOUS CC/REV
33-16850


FRONT VIEW
SIDE VIEW
REAR VIEW
SECTION C-C
REF: HPD-5966
HPD-6076
TYPE HOD 2 STREAM PUMP
W/LIP SEAL
ZENITH PUMPS DIVISION
33-16851
D2 TOOLSTEEL OR 440MOD
STAINLESS STEEL
CAPACITY CC/REV
ITW/DYNATEC PART #
2.92
084-E436
LASER ETCH ITW PART NO. AND CAPACITY
ROTATION
.125 MIN
084-EXXX Y.YYY
#404 WOODRUFF KEYWAY
.250ø OUTLET PORT 2-HOLES
.406ø MOUNTING BOLT HOLE 2-HOLES
ø .813 INLET 20.7 PORT
.386ø MOUNTING BOLT HOLE 2-HOLES
PRY SLOTS
NOTE
PUMPS TO BE SHIPPED WITH (4) BOLTS EACH
3/8-UNC X 3.25" ITEMS #52, AND (4) WASHERS
ITEMS #53, ø.688 X ø.393 X .062, FOR MOUNTING

ZENITH MELT SPINNING PUMPS MANUAL

Covers ITW Dynatec part numbers:

084E374
084E376
084E387
084E388
084E389
084E438



This maintenance manual is as specific as possible, but please remember that there are many varieties of Zenith® pumps in service. If you have any questions about specific parts and their orientation, always refer to the drawings and parts lists for your exact pump by type. If you still have questions, refer them to us at the factory.

1. Introduction

Zenith® "Melt Spinning" Pumps are precision instruments requiring skilled and careful maintenance. Constructed of high quality tool and die steels such as AISI types D-2, M-2, and M-4, or other high performance alloys, they are tempered after heat treatment to hardnesses ranging from Rockwell "C" Scale 58 to 64. A Zenith Pump may be constructed from any one or any combination of these steels since their coefficients of thermal expansion are almost identical.

Zenith Metering Pumps consist of two or more gears housed within center and side plates. Power is transmitted to the gears by the drive shaft which is either a through shaft, as in the packing gland type of pump, or a shaft with a tang that engages a universal seal coupling. The coupling is both a connection to external power and the rotating member of a mechanical seal.

In order to develop the high pressures demanded, the clearance between the metering gears and their housing must be as small as possible, yet large enough to allow adequate lubrication. Because of these close running clearances (in many cases as low .00025"), Zenith Pumps require careful maintenance and handling, especially of component parts. The slightest burr, nick or particle of foreign matter can cause scoring or even seizure.

2. General Operating Requirements

Since Zenith Pumps depend upon metered fluids for lubrication of their internal bearing surfaces, their recommended optimum operating speed range is between 10 and 75 rpm, depending upon viscosity and operating pressures. Increasing their operating speed improves their efficiency but also provides less time to fill the gear tooth spaces.

Cavitation may occur if sufficient inlet pressure is not provided. Cavitation, or the failure to fill the tooth spaces completely, causes low delivery and excessive wear. It also encourages the introduction of air through seals. Under ideal conditions, speeds up to 200 rpm have been maintained over long periods of time. You can, however, expect accelerated wear in such instances, depending on the lubricity of the solution and the differential pressure in the application.

Another cause of low through-put is slippage across the sides of the gears from the high pressure discharge section to the lower pressure inlet section when thin fluids are metered against a substantial differential pressure. This slippage is dependent on three factors: viscosity of the material, speed of the pump and the differential pressure. Therefore, even though the clearance between the gears and their housing may be as little as .00025", high slippage may still occur from high to low pressure ports, if viscosity is low and pressure high.

3. Preparing Your Zenith Pump for Use

Assembly

Assembled with mineral oil.
Cleaned with Acetone or MEK.

Since Zenith Pumps are precise instruments, their assembly requires detailed attention to every step.

1. Zenith Pumps are shipped filled with a rust preventative oil. Flush the oil out thoroughly with a cleaning solvent. It may be necessary to disassemble the seal arrangement to remove all traces of the oil, but disassemble only if necessary.
2. After flushing, the pump should be lubricated internally. Pour a suitable high temperature lubricant into the inlet port. Rotate the metering gears until the lubricant appears at the discharge port.
3. Mount the pump to a block with a flatness of true flat to .0001" convex and a surface finish of 4 to 8 rms to prevent leakage between the pump and the block. Make sure mounting bolts are lubricated (with DAG Dispersion #154, for example) and alternately torqued in even increments up to the manufacturer's recommended limit for the bolt size used (see Table).

Screw Torque Values* (Standard Alloy Steel)

Screw Size & Thread (UNC)		Torque (lb-in.) (Lubricated threads)
#10-24	(w/ Carbon Seal Gasket)	50
#10-24	(w/o Carbon Seal Gasket)	80
#12-24	.....	120
1/4-20	.....	160
5/16-18	.....	325
3/8-16	.....	360
1/2-13	.....	900

*In critical applications where control of bolt preload is important, the torque-tension relation should be determined by experimenting on the actual parts involved (including thread lubricants). At elevated temperatures, it is often desirable to reduce screw stress because of deformation (creep) under sustained loading. Screws constructed to type H-11 high temperature alloy steel provide extremely high creep resistance.

4. Heat the pump thoroughly and evenly (including the seal arrangement).
5. Tighten the mounting bolts and coupling housing screws to the manufacturer's recommended torque at that operating temperature. If your pump has a packing seal, take up firmly and evenly on the seal gland screws to compress the packing, then back off ½ turn of the screws. Be sure to adjust the gland properly. Do not overtighten. Adjustment may be made during operation to control excessive leakage.
   - Time Saving Heating Alternative: Maintain the clean and ready-to-use pump in an oven at operating temperature. This avoids thermal shock and saves valuable heating time.

4. Startup

1. Ensure that the pump is free turning and lubricated. Engage the outer drive shaft carefully, making sure that it

does not bottom in the slot of the coupling,* and that it is aligned within 1° angular and .005" parallel with the true pump drive axis.

*The coupling is the rotating member of the seal and depends on the internal operating pressure of the pump to force it forward and affect a seal against the carbon or metal seal plate.

- In pumps with a through shaft and compression packing seal, the pump to driver axis may shift unevenly due to pump heating expansion. To remedy this, we recommend connecting the pump driver to the pump shaft with a double universal joint arrangement. This type of joint will prevent bending loads from being transmitted to the pump shaft when misaligned. This greatly reduces the possibility of premature shaft failure due to fatigue. To prevent seizure, be sure to apply adequate high temperature lubrication to the universal joints.

2. After startup, take up gradually and evenly on the packing gland screws until slight weepage occurs.
3. Be sure to follow up closely throughout the running-in period of the packing until the seal is thoroughly seated. Do not completely seat the packing in one adjustment.

5. Cleaning

1. To clean melt spinning pumps, place them in a suitable furnace and gradually heat in an inert atmosphere for the initial hour to prevent flashing of the polymer. Time at temperature will be related to pump size and degree of polymer contamination and should be determined by trial.

   NOTE: Careful control of the furnace temperature and atmosphere is critical. Should the temperature exceed the original tempering temperature, the steel hardness may draw back and the dimensional stability of the pump may be upset. Consult Table for proper tempering temperature.

AISI Type	Tempered At	Rockwell C Hardness
D-2 (Ohio Air Die)	950°F (510°C)	58-60
M-2	1050°F (566°C)	61-64
M-4 (Neatro)	1050°F (566°C)	61-64

   - Another acceptable cleaning method is to immerse the pump in a fluidized bed cleaning bath. The bath should be heated to a temperature that is sufficient to carburize the polymer. The carburization process usually takes between 3-12 hours, depending on the polymer type, temperature, pump size and furnace load.

     CAUTION: Avoid exposing the pump to thermal shock when using this method of cleaning.

2. After gradually cooling to room temperature, the pump should be thoroughly flushed in a clean solvent. Again, it is usually necessary to disassemble only the seal arrangement to remove polymer ash.
3. Always replace the carbon seal plate after pump burnout. If the pump was performing satisfactorily when removed from service and still turns freely after burnout, pressure test it and add a high temperature lubricant to prepare it for return to service.

   - To store for future use, simply add a rust preventative oil.

6. Disassembly

If pumps are to be disassembled on a regular basis, we recommend that you establish a pump room with all the necessary tools and equipment for disassembly and cleaning with a separate "clean" area for assembly, testing and storing of rebuilt pumps.

If maintenance is required due to low delivery or seizure, the following procedure is recommended for disassembly.

NOTE: Be sure to note the location and orientation of all parts to ensure correct reassembly.

1. Remove the seal arrangement.
2. Remove all binder screws.
3. Remove dowels and arbors with an arbor press in the direction which disengages the press fit in the shortest distance.

   NOTE: Most dowels and arbors are press fit in the front side plate and slip fit in the center and rear side plates. When this is the case, it is preferable to press from the front (drive) side. Separate the plates by lightly tapping them with a soft head hammer. If pry slots are available in the pump, you may use them instead of, or in conjunction with, the above method. In either case, great care should be taken not to scratch or damage the internal pump surface when prying the plates apart.
4. After disassembly, clean all components in a glass bead blast cabinet to remove any debris remaining after heat cleaning.
5. Wash components in an ultrasonic cleaning tank and air dry.
6. Inspect all parts for nicks, burrs, score marks and other signs of wear.
   - The plates and sides of the gears may be hand blocked on 400/600 grit paper and any nicks, burrs or sharp edges can be lightly removed with an Arkansas stone.

     CAUTION: Since the thickness relationship between the metering gears and center plate is critical to metering performance, and the center plate is non-wearing on its sides, **lapping these components is not necessary and should not be done under any circumstances.**
7. To keep maintenance costs to a minimum, the following procedure is recommended.
   A. Measure used parts and compare their dimensions with new part standards. This will provide you with precise information on the wear of the pump parts and aid in maximizing the useful life of each component.
   B. Replace worn gears, shafts, bearings and center plates.
   C. Side and middle plates may be refinished by grinding and/or lapping them to remove wear markings and return them to flatness within .0001" convex and a surface finish of 4 to 8 rms.
8. Replace the sleeve bearings as necessary and hone in the plate to the original new part specifications.
9. After each resurfacing, carefully gauge the area between the inlet and discharge ports at the mesh of the gears. This area commonly referred to as the "throat" is the most critical part of the plate. Scoring or wear marks here will allow increased slippage from the high pressure discharge port section across the throat to the lower inlet port reducing efficiency. Therefore, carefully gauge this area for flatness after each resurfacing.

7. Reassembly

NOTE: During and between each reassembly step, manually turn the metering gears to ensure that they are free turning. If binding occurs at any time, determine the cause and correct it immediately. A tiny nick, burr or foreign particle can extensively damage a valuable pump component. Never use force in reassembling or turning a Zenith Pump. If properly aligned, the pieces will fit easily into place and the pump will turn freely.

Reassemble the pump as follows:

1. After all worn parts have been refinished or replaced, all parts should be thoroughly cleaned in a solvent and dried.
2. Using the driven gear as an uprighting fixture, carefully locate the arbor over its press fit hole in either the front or rear plate. Smoothly drive the arbor into its hole with the help of an appropriate arbor press.
3. Place the front side plate with the arbor in position in a soft-jaw vise or holding fixture.
4. Slip together the driving metering gear, drive shaft and key. Position in the front of the side plate by installing the drive shaft through the bearing.
5. Place the driven metering gear on its arbor and carefully mesh with the driving metering gear.
6. Carefully lower the center plate over the gears.
7. Position the rear side plate.
8. Rotate the gears to ensure free rotation.
9. Press the dowels into place moving in the direction of the shortest press distance. (Usually from the rear side of the pump.)
10. Lubricate the binder screws with DAG Dispersion #154 or a similar heat resistant lubricant and install. Torque the screws in even increments to the manufacturer's recommended limit. It is especially important to rotate the gears frequently during this operation.
11. Reassemble the seal arrangement, making sure the sealing surfaces are perfectly clean and free of scratches, nicks or burrs. When a carbon seal plate is used, always use a new carbon seal that has been lightly polished on 400/600 grit paper. When using a carbon seal, the coupling housing screws should be torqued to ½ the manufacturer's recommended torque limit.

    For pumps equipped with a compression packing seal, be sure all old packing is removed from the packing housing.
12. Inspect the drive shaft at the seal area making sure that it is not scored, shouldered or worn.
13. Dip the packing rings into high temperature oil and graphite. This aids in assembly and running-in of the packing.
14. Place the first packing over the shaft and force it firmly and evenly to the bottom of the packing housing. Tap it firmly into place.
15. Rotate the drive shaft by hand after each ring is installed to aid in seating the packing. Continue to install the rings in this manner until the proper number of packings have been installed.
16. Firmly compress the packing by alternating and evenly tightening up the gland screws, then back off ½ turn. Be sure to adjust the gland evenly.

8. Some Causes of Pump Failure

Problem	Cause
Seizure	a) foreign particle b) mounting block not flat c) uneven heating d) lack of lubrication e) interference fit of moving parts
Excessive Slippage (reduced pump efficiency)	a) worn gears: thickness and outside (reduced diameter, corners of teeth not square) b) worn center plate c) side plates scored at throat d) side plates not flat
Seal Leakage*	a) worn or scratched coupling or seal plate b) drive shaft bottoming in slot of coupling c) drive shaft misaligned

* A minor seal leak or weep is not abnormal and may be desirable for lubricating the seal surfaces.

9. Rehabilitation

Pumps may be returned to an authorized repair facility for rehabilitation. All repaired pumps must pass the same strict standards as new ones.

10. Factory Visit

If pumps are to be maintained at your plant, it can be very worthwhile to have key maintenance people spend a day at the Zenith factory to view manufacturing, gauging, and assembly techniques. Please contact us concerning plans for such a visit or with any questions you may have regarding the application or maintenance of your Zenith® "Melt Spinning" Pumps.

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ITW Dynatec
An Illinois Tool Works Company

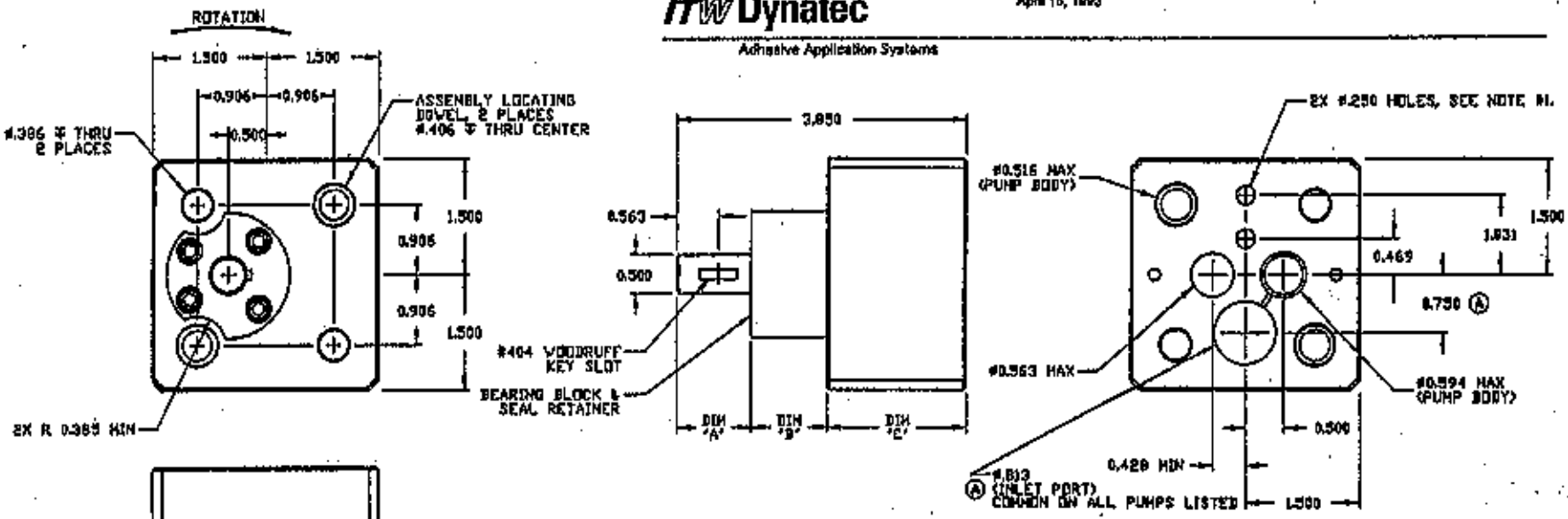
ITW Dynatec

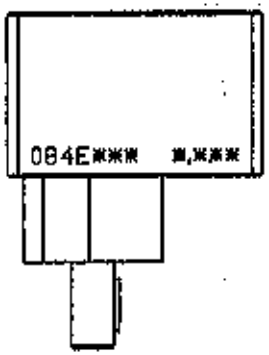
Adhesive Application Systems

ZENITH PUMPS CROSS REFERENCE CHART

PN's 084E372, 084E373, 084E374, 084E375, 084E376, 084E377, 084E387, 084E388, 084E389, 084E398, 084E399 & 084E400

April 15, 1993





DYNATEC PART #	DISPLACEMENT EACH GEAR SET	TYPE PUMP (# GEARS)	DIM 'A'	DIM 'B'	DIM 'C'	MTG. BOLT PART #	MTG. BOLT SIZE (FOUR REQ'D)	ADAPTER ASY. MDL 522 DOWN	ADAPTER ASY. MDL 522 UP	ADAPTER ASY. MDL 522SMS UP	ADAPTER ASY. MDL 522SHE
084E372	0.160 CC/REV	SINGLE (2)	1.250	1.000	1.600	078A536	3/8-16 X 2 5/8	084E405 *	084E379	084E404	084E406
084E373	0.297 CC/REV	SINGLE (2)	1.250	1.000	1.600	078A536	3/8-16 X 2 5/8	084E405 *	084E379	084E404	084E406
084E374	0.504 CC/REV	SINGLE (2)	1.250	1.000	1.600	078A536	3/8-16 X 2 5/8	084E405 *	084E379	084E404	084E406
084E375	1.168 CC/REV	SINGLE (2)	1.250	1.000	1.600	078A536	3/8-16 X 2 5/8	084E405 *	084E379	084E404	084E406
084E376	1.752 CC/REV	SINGLE (2)	1.250	1.000	1.600	078A536	3/8-16 X 2 5/8	084E405 *	084E379	084E404	084E406
084E377	2.920 CC/REV	SINGLE (2)	1.250	.600	2.000	078A060	3/8-16 X 3	084E405 *	084E379	084E404	084E406
084E387	0.160 CC/REV	DUAL (4)	1.058	1.000	1.795	078A158	3/8-16 X 2 3/4	084E405	084E379	084E404	084E406
084E388	0.297 CC/REV	DUAL (4)	1.053	1.000	1.795	078A158	3/8-16 X 2 3/4	084E405	084E379	084E404	084E406
084E389	0.504 CC/REV	DUAL (4)	1.053	1.000	1.795	078A158	3/8-16 X 2 3/4	084E405	084E379	084E404	084E406
084E398	1.168 CC/REV	DUAL (4)	1.062	.600	2.188	078A166	3/8-16 X 3 1/4	084E405	084E379	084E404	084E406
084E399	1.752 CC/REV	DUAL (4)	1.042	1.000	1.808	078A158	3/8-16 X 2 3/4	084E405	084E379	084E404	084E406
084E400	2.920 CC/REV	DUAL (4)	1.166	.660	2.082	078A564	3/8-16 X 3 1/8	084E405	084E379	084E404	084E406

'*' 084E380 ADAPTER ASSEMBLY CAN BE USED WITH SINGLE PUMPS ON MDL 522 DOWN.

NOTES:

1. THE TWO #.250 HOLES CONNECT INTERNALLY ON SINGLE (TWO GEAR) PUMPS. THESE HOLES ARE SEGREGATED OUTLETS ON DUAL (FOUR GEAR PUMPS).
2. ETCH PART NUMBER & DISPLACEMENT AT LOCATION SHOWN WITH MINIMUM .125 HIGH CHARACTERS.
3. ALL PUMPS ARE TO INCLUDE FOUR 3/8-16 SOCKET HEAD CAP SCREWS, GRADE 8 & BLACK OXIDED, OF THE APPROPRIATE LENGTH SHOWN ON CHART.

REV. NO.	NO. ECO	MADE BY (INIT.)	DATE	REVISIONS
A		LR	11-12-92	ADD VAR 600 ADD VAR 525

085E023

ITW Dynatec — Adhesive Application Systems
110 SCHOOL INDUSTRIAL DRIVE, SMYRNA/MURFREESBORO, TENNESSEE 37167
TELEPHONE AREA 615 355-0420

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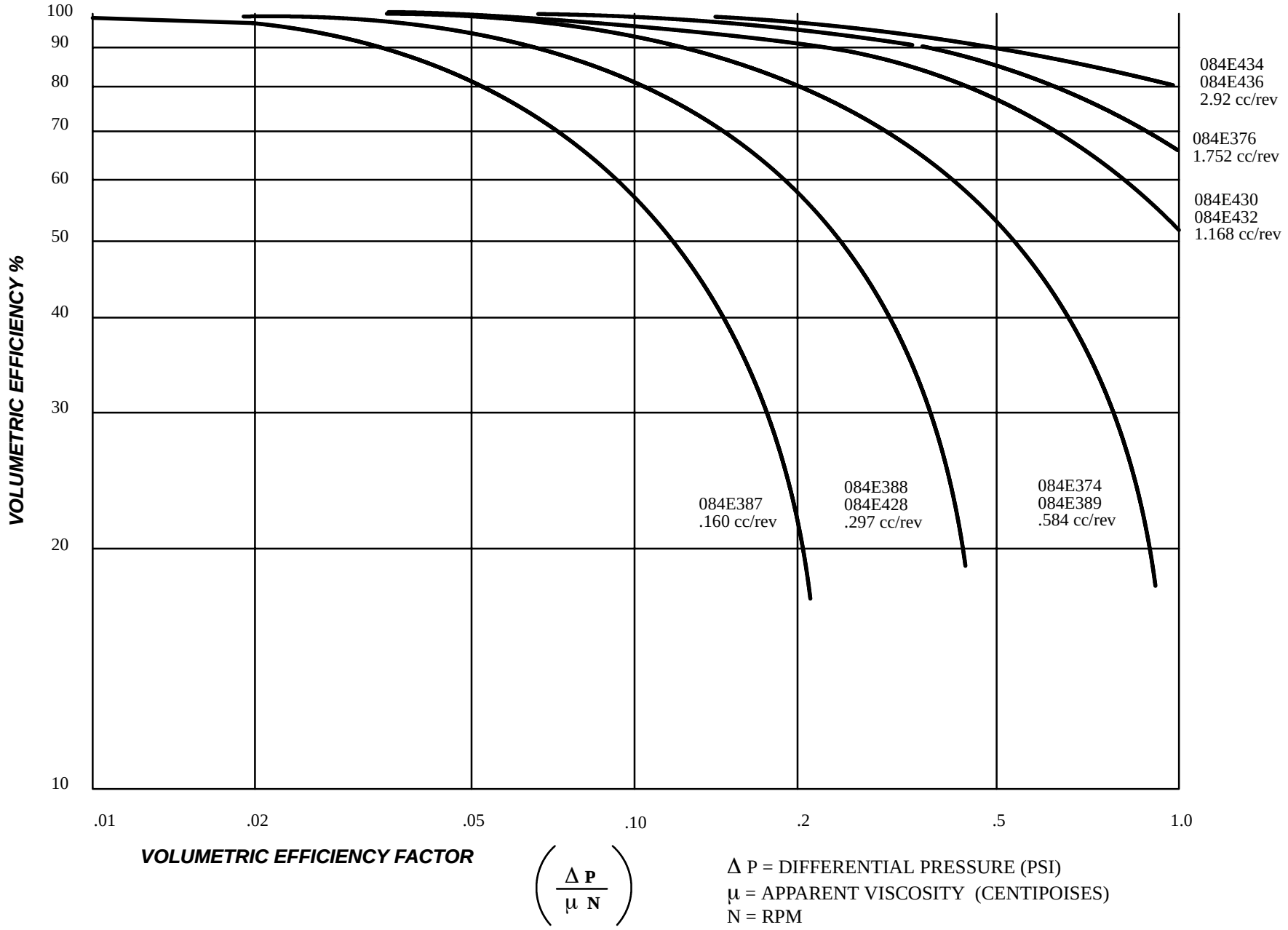
UNSPECIFIED TOLERANCES: DECIMALS ± ANGLES ±
DO NOT SCALE, WORK TO DIMENSIONS ONLY — SCALE: FULL

MATERIAL: D2
SPECIFICATION: RC 55-60
FINISH:
DRAWN BY: L. RIORDAN
CHECKED BY:
DATE: 09-25-92
PART USED ON:
SHEET 1 OF 1

DIRECTIONAL LAYOUT 0.160 THRU 2.920 ZENITH-DYNATEC SINGLE & DUAL PUMPS

PART DRAWING NUMBER: 085EC023
REV. A

HIGH ACCURANCY PUMP PERFORMANCE



PN 804467/ 805942 Pressure Transducer

INSTRUCTION SHEETS for
Standard Melt Pressure Transmitter ISI 0130, 0131, 0132
Oil Filled Melt Pressure Transmitter ISI 3130, 3131, 3132
4-20 mA Output

Installation Procedure

1. Remove protective cap from sensing diaphragm.

2. Lubricate threads with *Neverseez* by Bostik or *C5A* by *Felpro.*

3. Clean hole before installing transmitter – to ensure that any residue that may damage the sensor tip is removed.

4. Thread transmitter into the mounting hole hand tight, then ¼ turn with a wrench. The recommended torque is 150-500 inch pounds – maximum.

5. Bring the extruder to operating temperature. To correct for the temperature induced zero offset*: With the extruder at operating temperature and with no pressure applied to the transmitter, adjust the zero trim-pot on the transmitter until the readout indicates 4mA. This equals zero pressure. **The span is factory set for 20mA at full scale and does not require adjustment.**

   ***This zero shift is normal and expected and does not affect span or linearity.**

6. The calibration pressure of the readout instrument is factory set at 80% of full scale pressure. This can be done by pushing the calibration button on the readout instrument (if so equipped), or by shorting the blue (Pin E) and brown (Pin F) wires. This will create an output of approx. 16.8mA (80% of 4-20mA).

7. Perform calibration procedure according to last page of this document.

Note: Transducers installed on ITW Dynatec ASUs have been factory-calibrated.

Transmitter Removal

It is good operating practice to ensure that the extruder is at operating temperature when the transmitter is removed from the extruder barrel.

cont.

PN 805942/ 804467 Pressure Transducer, cont.

Removal of the transducer from a cold extruder may cause diaphragm damage due to polymer adhesion.

Cleaning of Transmitter

1. The transmitter sensing diaphragm can be cleaned with a clean, dry cloth while the tip is still hot. If there is solid polymer present, a fluidized bed cleaning system may be used.

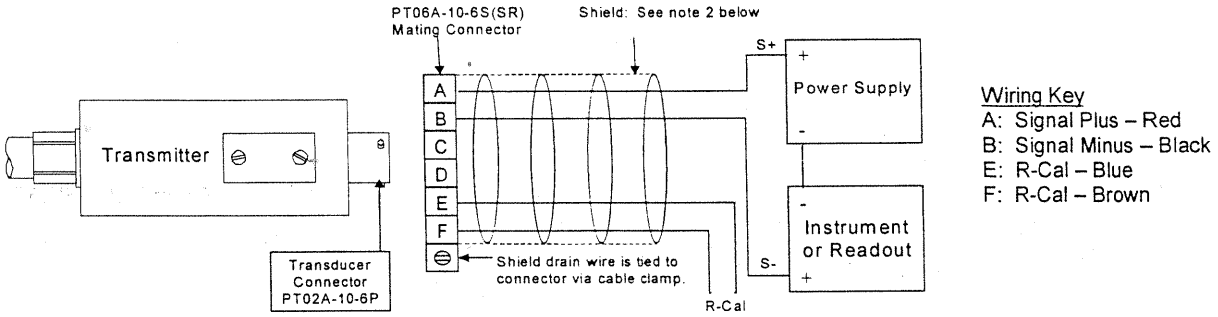
2. Tools such as wire wheels or abrasive cloths should not be used to clean the transmitter tip.

3. The transmitter must be removed before using an abrasive material or wire brush to clean the extruder barrel.

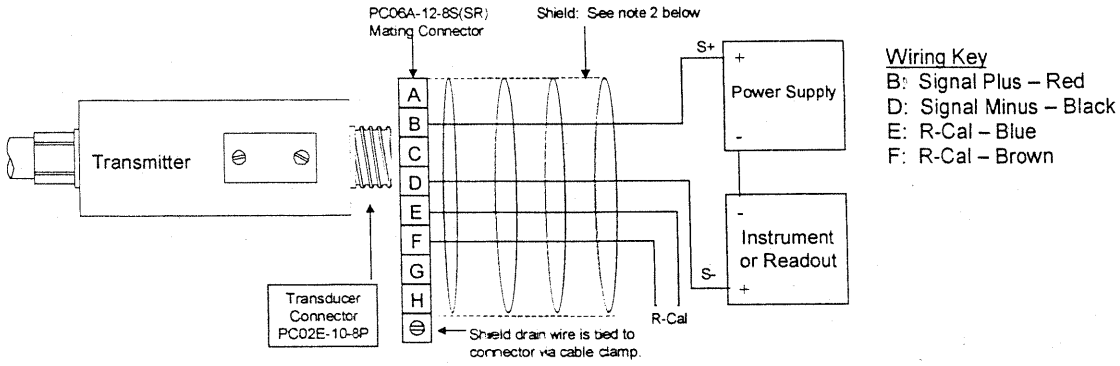
Wiring Diagrams

1. The power supply/instrument end of the cable should be wired as shown below.

6-Pin Wiring

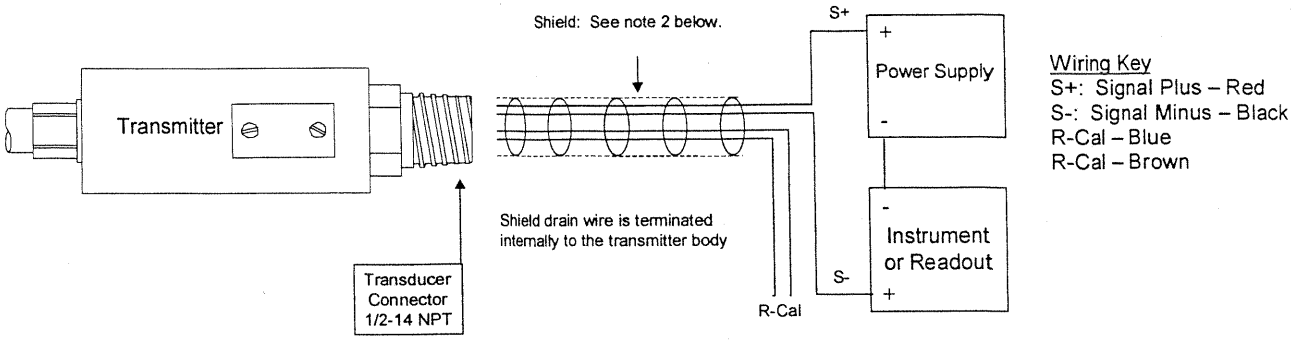


8-Pin Wiring



PN 804467/ 805942 Pressure Transducer, cont.

NPT Wiring

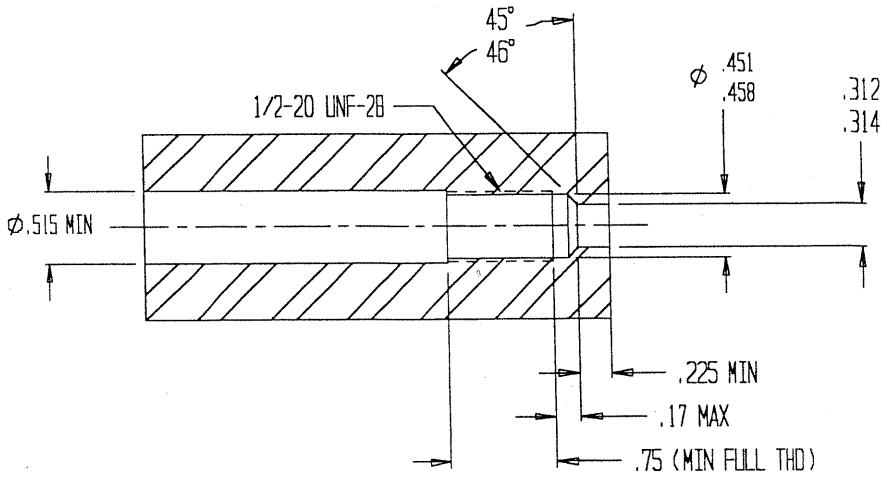


2. Under normal conditions the transmitter will operate normally with the cable shield not terminated at the instrument end of the cable. However, in high frequency (RF) environments it may be necessary to connect this shield to ground.

3. The power supply and instrument loading requirements are:

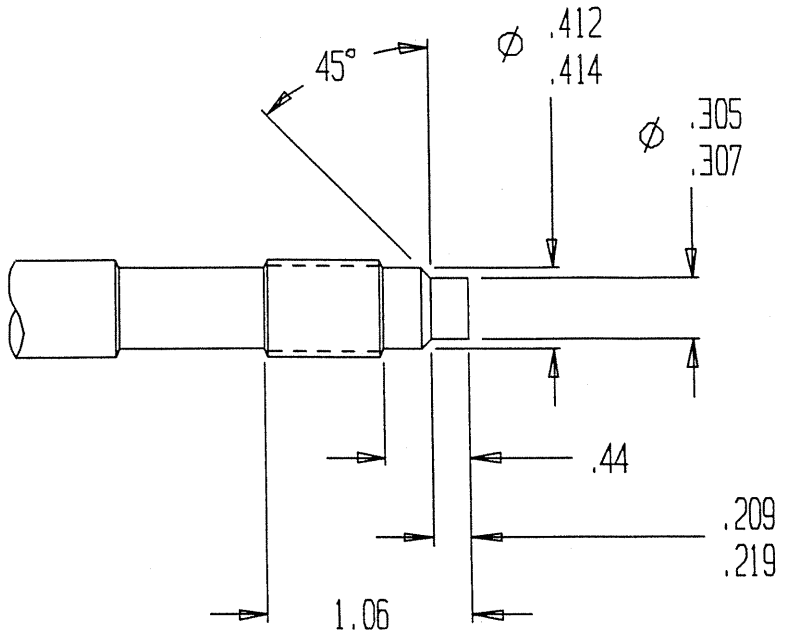
Transmitter Output	4-20 mA
Power Supply Input	18-36 VDC (24 VDC recommended)
Instrument Load	1200 Ohms (max. @ 36 VDC)
	600 Ohms (max. @ 24 VDC)

Mounting Hole Dimensions

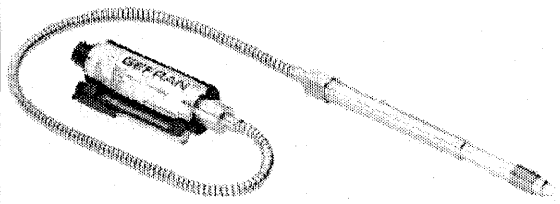


PN 804467/ 805942 Pressure Transducer, cont.

Transducer tip dimensions.



Transmitter Operation & Calibration

Transmitter Operation & Calibration (M, W & K Series)	
	The Transmitter will remain in the normal operatng mode until one of the described functions is enabled using either the supplied magnetic pen or the optional remote enable. **Contents** 1) Autozero 2) Fine-Autozero 3) Calibration 4) Autospan 5) Partial Reset 6) Total Reset
1) AUTOZERO	
The Autozero function is activated by: 1) Positioning the magnet pen near the Autozero label on the shell of the sensor for a period between 1 and 10 seconds. 2) Short-circuiting pins E-F for a period between 1 and 10 seconds. (available only with the optional External Autozero feature).	The Autozero function results: 1) The effect of the Autozero function will be visible after 2 seconds from the start. 2) The zero value precision is defined by the accuracy class of the sensor. 3) See Table 1 for defined limits of the Autozero function. It is possible to have a short duration overcurrent up to 7mA during the Autozero operation.

PN 106877 Pneumatic Clutch Kit

HORTON CLUTCH MODEL 625

MODULAR UNITS: MDU & MOU

ITW Dynatec ASUs use Model 625, MDU & MOU.
The following 9 pages from the Horton clutch manual have been edited to include only information on the 625 clutch.

Read this manual carefully, making full use of its explanations and instructions. The "Know How" of safe, continuous, trouble-free operation depends on the degree of your understanding of the system and your willingness to keep all components in proper operating condition. Pay particular attention to all NOTES, CAUTIONS, and WARNINGS to avoid the risk of personal injury or property damage. It is important to understand that these NOTES, CAUTIONS, and WARNINGS are not exhaustive. Horton cannot possibly know or evaluate all conceivable methods in which service may be performed, or the possible hazardous consequences of each method. Accordingly, anyone who uses a procedure that is not recommended by Horton must first satisfy themselves that neither their safety or the safety of the product will be jeopardized by the service method selected.

cont.

Pneumatic Clutch, cont.

CONNECTING UNITS TO FORM COMBINATIONS

MODULAR CLUTCH (MDO)

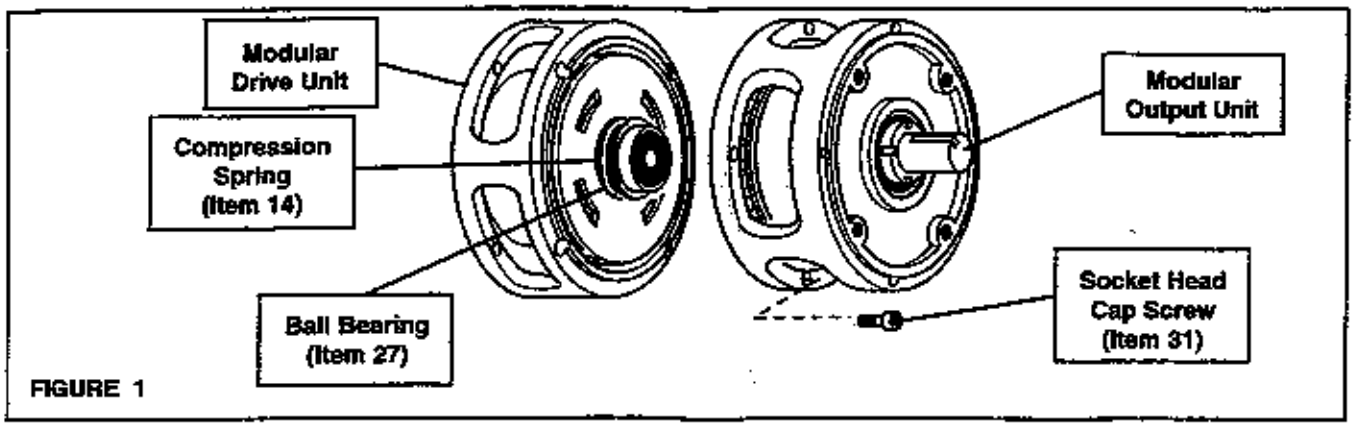


FIGURE 1

NOTE

The Modular Drive Unit (MDU) Ball Bearing (Item 27) is loose fitting by design. Do not allow this Ball Bearing to fall off the MDU.

1. Place the Modular Drive Unit (MDU) on a table with the Ball Bearing (Item 27) facing up and properly seated against the Retaining Ring on Models 625, 875, and 1375 or the Hub on Model 1125 (See Figure 1).
2. Set the Modular Output Unit (MOU) onto the MDU, making sure the Ball Bearing (Item 27) is fully seated into the bore of the MOU (See Figure 1).
3. Rotate the MOU until the four clearance holes are aligned with the four MDU tapped holes (See Figure 1).
4. Press the MOU down against the Compression Spring (Item 14) until the faces of both units are flush (See Figure 1).

WARNING

Never substitute Hex. Head Cap Screws for the Socket Head Cap Screws (Item 31).

NOTE

Make sure the air inlet ports are properly aligned for your mounting requirements.

5. Using the four Socket Head Cap Screws (Item 31), secure the MOU to the MDU (See Figure 1).
6. Alternately and evenly tighten the four Socket Head Cap Screws (Item 31) to 50 Ft. Lbs. [69 N•m] torque (See Figure 1).

MOUNTING MODULAR UNITS

MODELS 625 AND 875 TO A MOTOR

1. Place the Key (Item 19) into the motor shaft; then, slide the motor shaft into the Modular Unit (See Figure 7).
2. Rotate the Modular Unit until the clearance holes in the Modular Unit are aligned with the tapped holes in the Motor; then, using the four Hex. Head Cap Screws (Item 33) and Lock Washers (Item 24), secure the motor to the Modular Unit (See Figure 7).
3. Alternately and evenly tighten the four Hex. Head Cap Screws to 20 Ft. Lbs. [27 N•m] torque.

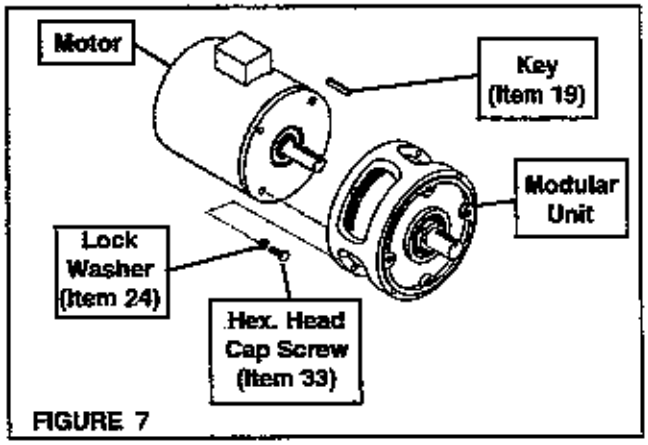


FIGURE 7

cont.

Pneumatic Clutch, cont.

ALL MODELS AND MOTOR TO A REDUCER

CAUTION

When mounting sheaves or sprockets, refer to Table 1 for overhung load data. Exceeding the data in Table 1 will result in premature failure to the Modular Unit.

1. Place the Key (Item 19) into the output shaft of the Modular Unit and slide the output shaft of the Modular Unit and motor into the reducer.
2. Rotate the Modular Unit and motor until the holes in the Modular Unit are aligned with the holes in the reducer flange, and the air inlet ports of the Modular Unit are facing down.
3. Using four Hex. Head Cap Screws, secure the Modular Unit and motor to the reducer.
4. Alternately and evenly tighten the four Hex. Head Cap Screws, making sure the Modular Unit and reducer faces are flush with each other.

OVERHUNG LOAD DATA					
MODEL	RPM	* Load 1" [25.4 mm] from Pilot Face			
		625	875	1125	1375
MBU	1200	281 Lbs.	281 Lbs.	544 Lbs.	610 Lbs.
	1800	321 Lbs.	321 Lbs.	636 Lbs.	700 Lbs.
MDU	1200	281 Lbs.	281 Lbs.	544 Lbs.	610 Lbs.
	1800	321 Lbs.	321 Lbs.	636 Lbs.	700 Lbs.
MIU	1200	244 Lbs.	244 Lbs.	570 Lbs.	570 Lbs.
	1800	279 Lbs.	279 Lbs.	655 Lbs.	655 Lbs.
* Based on 10,000 hrs. average life and using 50 psi air.					

TABLE 1

HOUSING GUARD INSTALLATION

WARNING

Always have the Housing Guard in place when operating Modular Units (See Figure 9).

Each Modular Unit is provided with a Housing Guard. After combining the Modular Units, install the Housing Guard so one of the ribs of the Modular Unit housing is directly beneath the clamp on the Housing Guard.

Waterproof guards are also available. Purchase waterproof guards from your local Horton Distributor.

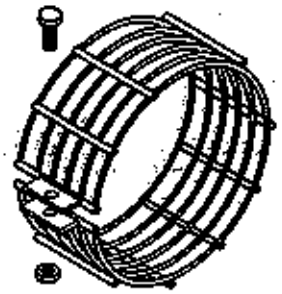


FIGURE 9
HOUSING GUARD

ACCESSORIES

MODULAR HOUSING GUARDS		
TYPE	MODELS	PRODUCT NUMBER
Ring Guard	All 625 and 875	929500
	All 1125 and 1375	935900
Waterproof Guard (Not Shown)	MBU 625 and 875	929502
	MBU 1125 and 1375	935902
	MDU 625 and 875	929501
	MDU 1125 and 1375	935901

Pneumatic Clutch, cont.

LUBRICATION

NOTE

Pneumatically actuated devices require clean, pressure regulated, and lubricated air for maximum performance and long life. The most effective and economical way to lubricate Horton Clutches and Brakes is with an Air Line Lubricator, which injects oil into the pressurized air, forcing an oil mist into the air chamber.

Locate the lubricator above and within ten feet of the Clutch or Brake, and use a low viscosity oil such as SAE-10.

Synthetic lubricants are not recommended.

LUBRICATOR DRIP RATE SETTINGS

NOTE

These settings are for Horton supplied lubricators. If you are not using a Horton lubricator, calibration must replicate the following procedure.

1. Close and disconnect the air line from the unit.
2. Turn the Lubricator Adjustment Knob clockwise three complete turns.
3. Open the air line.
4. Close the air line to the unit when a drop of oil forms in the Lubricator Sight Gage.
5. Connect the air line to the unit.
6. Turn the Lubricator Adjustment Knob counterclockwise until closed.
7. Turn the Lubricator Adjustment Knob clockwise one-third turn.
8. Open the air line to the unit.

AIR CONNECTIONS

NOTE

For quick response, Horton recommends a quick exhaust valve and short air lines between the Control Valves and the Modular Units. Align the air inlet ports to a down position to allow condensation to drain out of the the air chambers of the Modular Units.

Adjust the air pressure to approximately 50 psi [3.45 bar] when the Modular Unit is installed between a motor and gear reducer.

When the Modular Unit is mounted using sheaves or sprockets, the air pressure may be regulated between 10 psi [0.7 bar] to 80 psi [5.5 bar] to ensure air pressure is adequate for torque requirements.

CAUTION

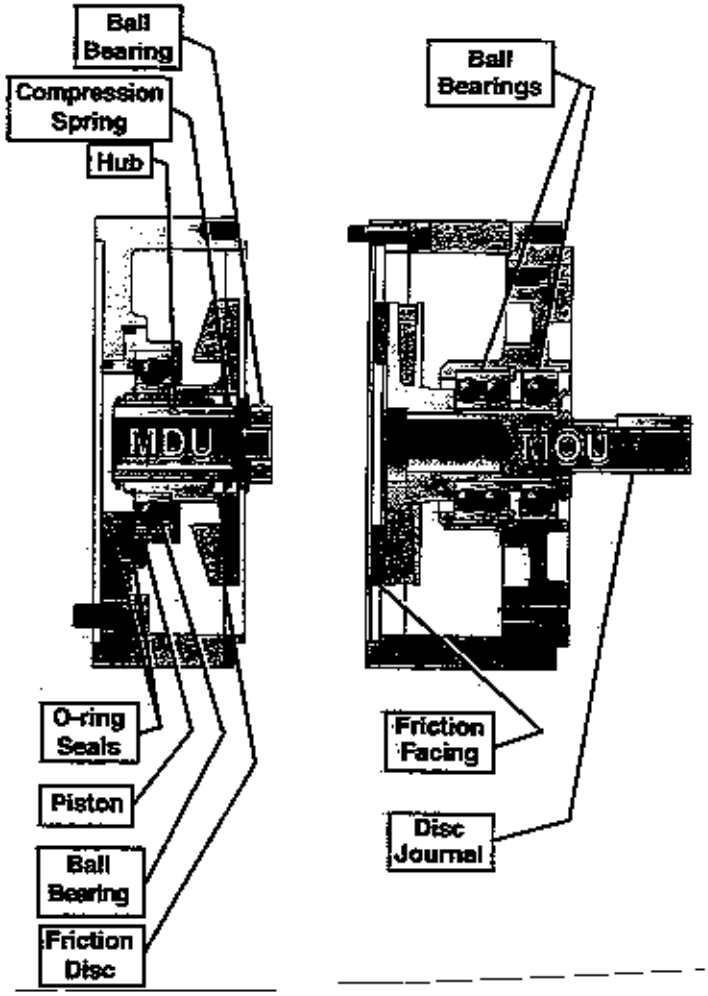
Low air pressure will cause slippage and overheating. Excessive air pressure will cause abrupt starts and stops, reducing Modular Unit life.

cont.

Pneumatic Clutch, cont.

TROUBLESHOOTING

MODEL	SYMPTOM	PROBABLE CAUSE	SOLUTION
MIU (Modular Input Unit)	Bearing noise.	Damaged Ball Bearings.	Replace the Ball Bearings.
MDU (Modular Drive Unit)	Failure to engage.	Leaking O-ring Seals.	Replace the O-ring Seals.
		Lack of lubrication on the Hub spline.	Lubricate the Hub spline with Never-Seez®.
		Damaged Ball Bearings.	Replace the Ball Bearings.
		Improper air pressure settings or faulty controls.	Adjust the air pressure setting or replace the controls.
	Failure to disengage.	Lack of lubrication on the Hub spline.	Lubricate the Hub spline with Never-Seez®.
		Damaged Ball Bearings.	Replace the Ball Bearings.
		Broken or damaged Spring.	Replace the Spring.
MOU (Modular Output Unit)	Failure to engage.	Damaged Ball Bearings.	Replace the Ball Bearings.
		Worn or contaminated Friction Facings.	Replace the Friction Facings.



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Pneumatic Clutch, cont.

MODULAR OUTPUT UNIT (MOU)

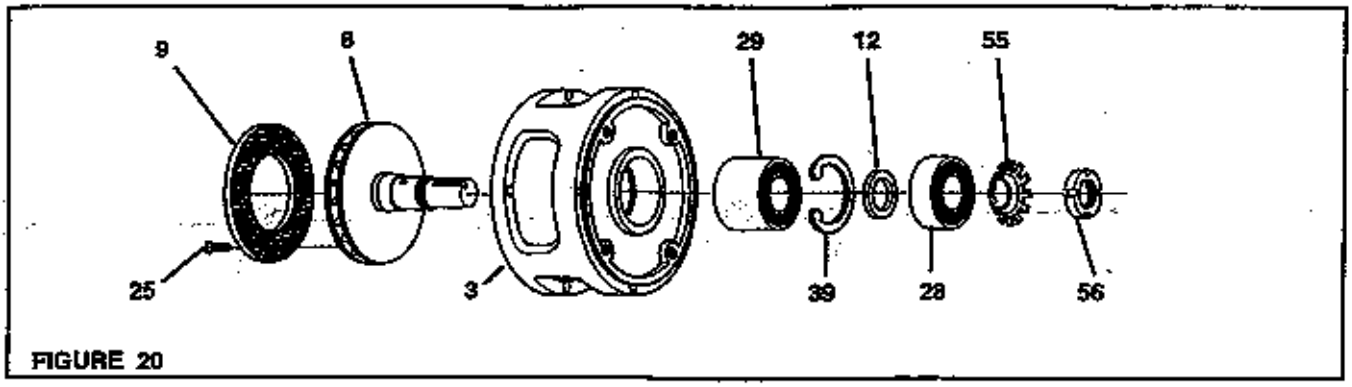


FIGURE 20

Models 1125 and 1375

1. Bend back the tabs on the old Keyed Washer (Item 55) and remove the Lock Nut (Item 56) and Keyed Washer (See Figure 20).
2. Fully support the Housing (Item 3) and press the Disc Journal (Item 8) out of the Housing (See Figure 20).
3. Using a bearing puller, remove the old Ball Bearing (Item 28) from the Housing (Item 3) (See Figure 20).

WARNING

Special attention should be exercised when working with retaining rings. Always wear safety goggles when working with spring or tension loaded fasteners or devices.

4. Remove the Spacer (Item 12) and Retaining Ring (Item 39) from the Housing (Item 3) (See Figure 20).
5. Press the old Ball Bearing (Item 29) out of the Housing (Item 3) (See Figure 20).
6. Remove the six old Flat Head Screws (Item 25) securing the old Friction Facing (Item 9) to the Disc Journal (Item 8) and remove the old Friction Facing (See Figure 20).
7. Using six new Flat Head Screws (Item 25), secure a new Friction Facing (Item 9) to the Disc Journal (Item 8) (See Figure 20).
8. Tighten the six flat Head Screws to 22 in. Lbs. [2.50 Nm] torque.
9. Clean the Bearing Bore of the Housing (Item 3) with fresh solvent, making sure all old Loctite® residue is removed (See Figure 20).
10. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Ball Bearing (Item 29) and press the new Ball Bearing into the Housing (Item 3) (See Figure 20).
11. Reinstall the Spacer (Item 12) and the Retaining Ring (Item 39) (See Figure 20).
12. Apply an adequate amount of Loctite® 680 to evenly coat the outer race of the new Ball Bearing (Item 28) and press the new Ball Bearing into the Housing (Item 3) (See Figure 20).
13. Support the inner race of the new Ball Bearing (Item 28) and press the Disc Journal (Item 8) into the Ball Bearings (Items 28 and 29) and Housing (Item 3) (See Figure 20).
14. Slide a new Keyed Washer (Item 55) onto the Disc Journal (Item 8) and reinstall the Lock Nut (Item 56).
15. Bend down the tabs of the Keyed Washer (Item 55) to lock the Lock Nut (Item 56) (See Figure 20).

REPLACEMENT PARTS

The item or balloon number for all Horton products is used for part identification on all product parts lists, product price lists, unit assembly drawings, bills of materials, and instruction manuals.

When ordering replacement parts, specify model designation, item number, part description, and quantity. Purchase replacement parts through your local Horton Distributor.

cont.

Pneumatic Clutch, cont. Parts List

MODULAR DRIVE UNIT (MDU)

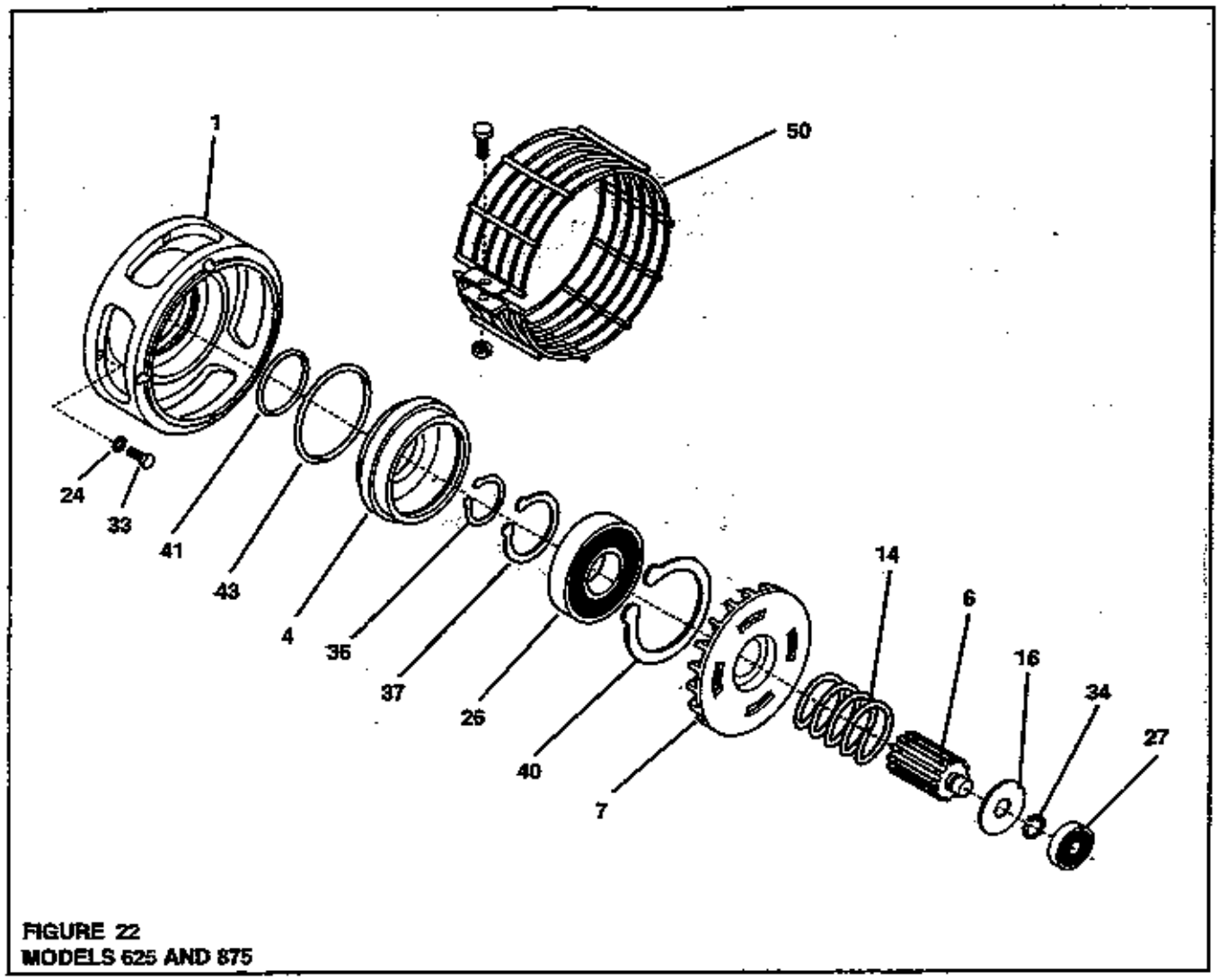


FIGURE 22
MODELS 625 AND 875

ITEM	DESCRIPTION	QTY
1	Housing	1
4	Piston	1
6	Hub	1
7	Friction Disc	1
14[1]	Compression Spring	1
16	Spring Retainer Washer	1
19	Key (Not Shown)	1
24	Lock Washer	4
26[1]	Ball Bearing	1

ITEM	DESCRIPTION	QTY
27[1]	Ball Bearing	1
33	Hex. Head Cap Screw	4
34	Retaining Ring (Ext.)	1
36	Retaining Ring (Ext.)	1
37	Retaining Ring (Ext.)	1
40	Retaining Ring (Int.)	1
41[1]	O-ring Seal	1
43[1]	O-ring Seal	1
50	Housing Guard	1

[1] Denotes Repair Kit item.
MDU 625 and 875 Repair Kit No. 930100.

cont.

Pneumatic Clutch, cont.

MODULAR OUTPUT UNIT (MOU)

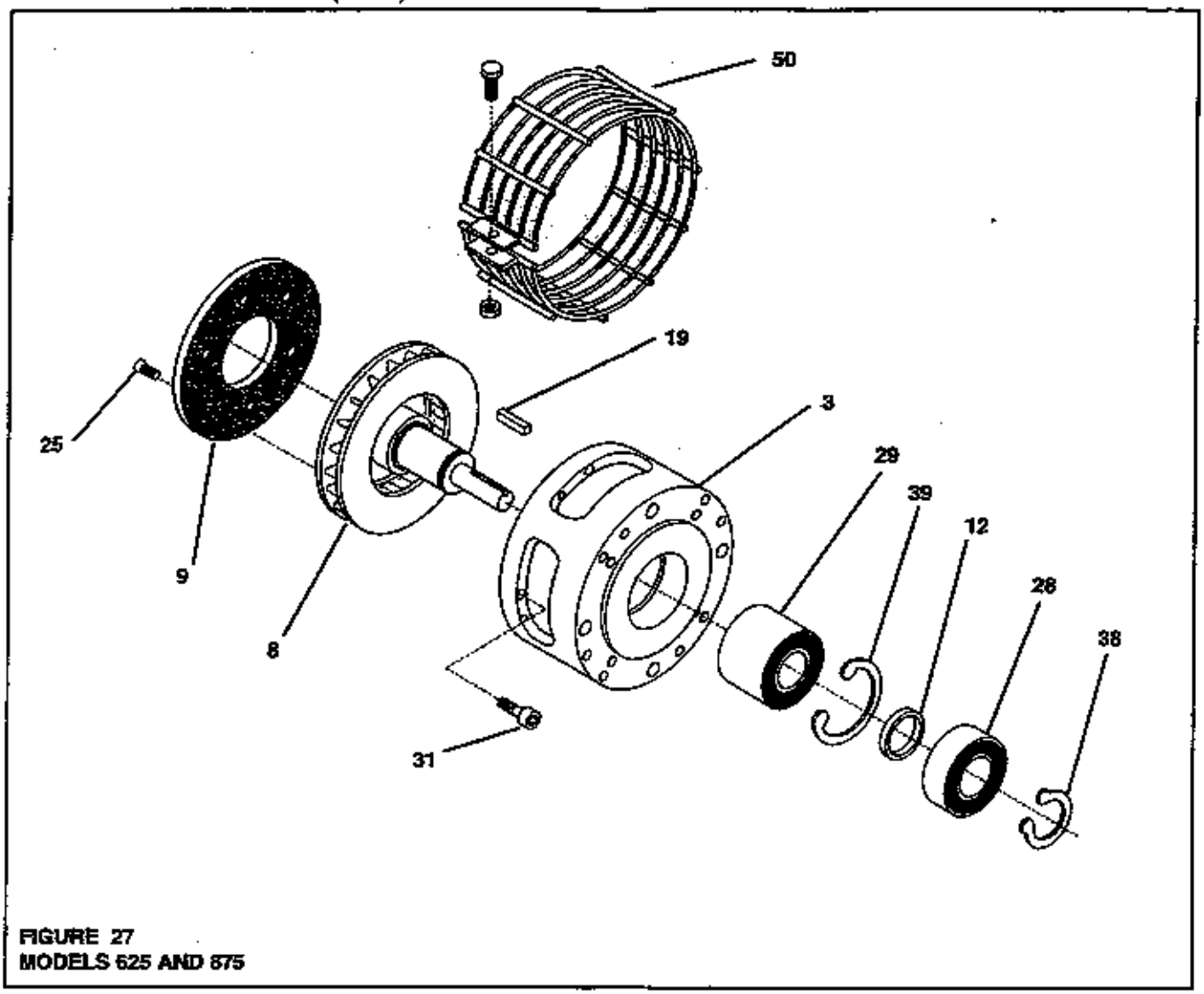


FIGURE 27
MODELS 625 AND 875

ITEM	DESCRIPTION	QTY
3	Housing	1
8	Disc Journal	1
9[1,2]	Friction Facing	1
12[1]	Spacer	1
19	Key	1
25[1,2]	Flat Head Machine Screw	6

ITEM	DESCRIPTION	QTY
28[1]	Ball Bearing	1
29[1]	Ball Bearing	1
31	Socket Head Cap Screw	4
38	Retaining Ring	1
39	Retaining Ring	1
50	Housing Guard	1

[1] Denotes Repair Kit item.
MOU 625 and 875 Repair Kit No. 930300.

[2] Denotes Friction Facing Kit item.
MBU 625 and 875 Friction Facing Kit No. 930276.

TOOL-STEEL HIGH ACCURACY GEAR PUMPS
USER'S GUIDE

Pump #	Identifier	Displacement	Type	# Gears	# Plates	Shaft Seal #
108863	TSHA*	0.160 cc rev.	single	2	3	807729
108864	TSHA*	0.160 cc rev.	dual	4	5	807729
108865	TSHA*	0.297 cc rev.	single	2	3	807729
108866	TSHA*	0.297 cc rev.	dual	4	5	807729
108867	TSHA*	0.584 cc rev.	single	2	3	807729
108868	TSHA*	0.584 cc rev.	dual	4	5	807729
108869	TSHA*	1.168 cc rev.	single	2	3	807729
108870	TSHA*	1.168 cc rev.	dual	4	5	807729
108871	TSHA*	1.752 cc rev.	single	2	3	807729
108872	TSHA*	2.920 cc rev.	single	2	3	807729
108873	TSHA*	4.500 cc rev.	dual	4	5	807729
108874	TSHA*	2.920 cc rev.	dual	4	5	807729
108875	TSHA*	8.500 cc rev.	single	2	3	807729
110289	TSHA*	20.0 cc rev.	single	2	3	808680
110290	TSHA*	30.0 cc rev.	single	2	3	808680
110291	TSHA*	45.0 cc rev.	single	2	3	808680

** Tool Steel, High Accuracy*

Customer should read and thoroughly understand this manual before installation and operation of pump.

If necessary, any Dynatec pump requiring maintenance can be returned to the factory for complete repair and overhaul. Please contact our Rebuild Department for further details.

Description

ITW Dynatec's metering gearpumps are manufactured to precise tolerances. To retain their high performance, these pumps must be carefully installed and maintained. These pumps are CE (Declaration of Conformity) rated.

Health & Safety

Dismantling

Internal components are precisely machined and have sharp edges and corners. These features are essential to the accurate metering performance. Particular care must be exercised when handling these components.

Cleaning

Cleaning fluids and methods are subject to strict Health and Safety regulations. Avoid contact with skin, do not inhale fumes and protect eyes.

Operation

Pump outlet pressure and speed limits are dependant on fluid viscosity and throughput. Pump inlet pressure is an important feature for lubrication and fluid homogeneity. Materials for pump construction are important for corrosion and wear resistance. Consult ITW Dynatec for detailed applications. Normally the pumps are single or dual output. Typical speed ranges are 10-90 rev/min.

Flushing

To avoid contamination of process fluid, the pump should be flushed out to remove test oil. Precaution must also be taken to flush out pumps at plant shutdown, since congealed fluid can cause seizure.

Filtration

Unless fluid purity can be guaranteed (especially from metal fragments), filtration must be installed before pump inlet, to avoid damage to pump internals.

Note: The following guide is for general purposes only. Due allowance must be made for any special features.

Installation

Ensure pump is free from protective packing materials and rotates freely.

Pump Drive

Drive alignment is very important. Ensure backlash is 0.1mm (0.004") to avoid shock or radial load. In the event of driveshaft connection, two flexible components must be incorporated into each driveshaft to allow for misalignment. These flexible components must have the capacity to distort over the misalignment range while ensuring that any radial load is minimal. Do not allow

shaft to put end thrust on the pump.

Rotation
Ensure drive rotates in correct direction (generally counter-clockwise at the pump drive spindle). The pump must be checked for smooth operation by hand.

Fixing and Lubrication
The pump must be fixed securely to maintain position and alignment. When secured by lubricated bolts, torque them evenly to the suggested torque (see Maintenance).

Start drive and bring up to speed slowly. Flush with process fluid.

Note: motor baseplate assemblies should be pre-checked in case the drive alignment has been disturbed.

Gland Leakage
If oil seal is fitted, there should not be any fluid leakage.

Problem-finding Chart

Problem	Remedy
LEAKAGE	
Screws not tight	Re-torque
Seal scratched or worn	Replace seal
FLOW RATE ERROR	
Gear worn on diameter or width	Return to ITW Dynatec
Gear teeth damage	Return to ITW Dynatec
Plates worn, scratched or not flat	Return to ITW Dynatec
Low inlet pressure (cavitation)	Check process
High outlet pressure (slippage)	Check process

Cleaning

Before removal from machine, the pump should be rotated for a short period (with inlet supply shut off) to discharge process fluid. Care should be taken, when removing and stripping the pump, to allow for any residual fluid. Pump components can be solvent or ultrasonically cleaned by immersion, using a compartmentalized wire baset. Dry in air. Stubborn residues may be removed with a brass wire brush. Avoid burnishing the sharp edges of gear and gear races.

Fluid immersion in rust inhibitor is advised. If components are to be stored for some time, they should be lightly smeared with oil.

Maintenance

Tightening Torque
for High Tensile ISO 12.9 Lubricated Bolts (300°C max)

Bolt Size & Qty.	Bolt Location	Torque Nm/ Ft.lbs.
M5 (4)	retainer cap	7.1/ 5.2
M10, 12 (4)	mounting bolts	41/ 30 at ambient temperature
M10, 12 (4)	mounting bolts	24/ 18 at production temperature

Notes: If mounting bolts are torqued at production temperature, they should be re-torqued (to 41 Nm/30 Ft lb.) when machine is at ambient temperature.

1 Nm = 8.85 in/lbs. Torques given above are for Metric and UNF threads. Multiply by 0.8 for UNC and BSF threads.Multiply by 0.8 for BSVV threads (multiply by 0.67 for stainless steel)

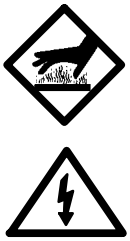
ITW Dynatec frequently provides special features at their customer’s request. Please consult with ITW Dynatec, quoting job and pump references, if questions arise.

Reconditioning

Should reconditioning (overhauling) become necessary, return the pump to ITW Dynatec.

Pump Shaft Seal Replacement

The ITW Part Number for all Standard Tool Steel High Accuracy Pump Shaft Seals (8.5cc and smaller) is PN 807729.

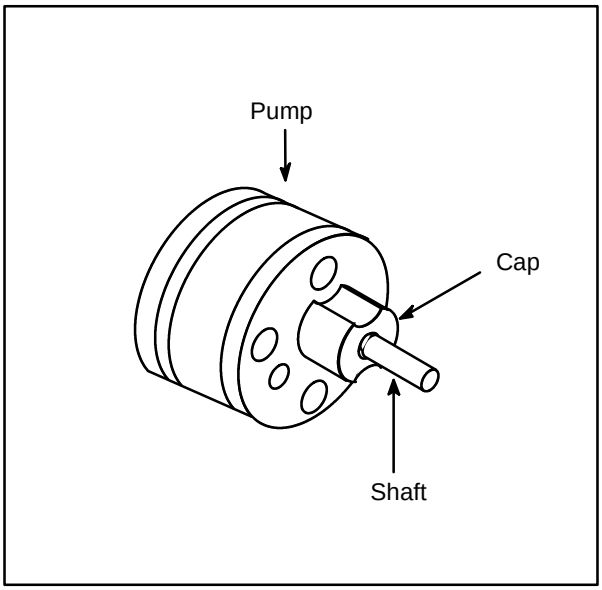


DANGER HOT SURFACE & HIGH VOLTAGE

If the pump is not operable but the heating system will function, raise the temperature of the application system to the operating temperature to aid in the pump disassembly process. Otherwise, a heat gun or other controlled heating method is recommended to melt hardened hot melt material. Never use a torch or an open flame on any of the components of the application system. Once the system is up to temperature, disconnect all incoming power before proceeding.

Pump Shaft Seal (O-ring) Replacement:

In most cases, the pump does not have to be removed from the ASU in order to replace the shaft seal.



1. Disconnect the drive coupling so that the pump may be accessed.

2. Remove the four screws in the pump “cap” and remove the cap.

3. Within the cap is the pump shaft seal. Remove the old seal.

4. Clean all pump parts, paying particular attention to the pump shaft seal groove.

5. Lightly lubricate the shaft seal before inserting it in the shaft seal groove.

6. Before re-assembling, wrap a small piece of paper around the shaft so that the shaft’s woodruff key seat does not damage the new seal.

7. Re-assemble. Remove paper.

8. Re-tighten four screws.

9. Re-connect drive coupling.

10. Return ASU to operation and check pump for leaks.

Rebuild Kit for 8.5cc TSHA Pump, PN 111939

The rebuild kit for the PN 108875 8.5cc TSHA pump consists of the following parts:

PN	Description	Qty.	PN	Description	Qty.
111699	Drive Shaft	1	111707	Retaining Ring	1
111699	Idler Shaft	1	111709	Screw, 10-24	4
111701	Bushing, Front Plate	1	807729	Pump Shaft Seal	1
111702	Bushing, Back Plate	1	111705	Key	1
111704	Dowel	2	078I001	Key, Woodruff	1